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ENTRIES 1440–1681

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

[Unsigned abstracts are by the editor.]

1440. BAKER, FREDERICK S. **Native plants as indicators of forest planting sites.** Jour. Ecol. 6: 96. Mar. 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—The native vegetation on a given site indicates the chief factors governing the value of that site for forest planting, based on the nature of its root systems, the transpirational activity, and its place in the natural succession. However, the indicator plants react upon the site and must also be taken into consideration in determining its potentiality. —*Frederick S. Baker.*

1441. EMIG, W. H. **The plant geography of the Arbuckle Mountains, Oklahoma.** Jour. Ecol. 6: 95. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—In these studies the plants were grown in glass tubes and were under constant conditions of temperature and illumination. A prepared gaseous mixture containing oxygen in concentration varying between about 0.7 per cent and 14.4 per cent was employed. The root growth of *Prosopis velutina* and *Opuntia versicolor* as well as that of certain other species, in soil with unlike oxygen content, was observed. The results previously obtained, namely, that the roots of *Opuntia* appear to require a better aerated soil for growth than do those of *Prosopis*, were verified. Growth of the roots of cuttings of *Opuntia* and of relatively long *Prosopis* roots ceases promptly in an atmosphere containing less than 1 per cent oxygen, but if there is 10 per cent more or less oxygen in the air of the soil, root growth continues for several hours at a diminishing rate, and at length ceases. The rate of root growth at parallel soil temperatures and in an atmosphere of the same oxygen content is always greater in *Prosopis* than in *Opuntia.* The relation of root growth of relatively young *Prosopis* plants to oxygen appears to be inconsistent, although exactly on what this is based was not learned. A certain, but relatively slow growth rate occurs in the roots of very young *Prosopis* in an atmosphere containing less than 1 per cent oxygen. Under the same conditions the roots of *Covillea tridentata* of the same age either exhibit no growth or very little growth. Thus it is shown that the roots of young and relatively young desert plants show unlike relations to oxygen.—*W. H. Emig.*

1442. HEMSLEY, W. B. **The palms of Seychelles and the Mascarenes.** Nature 101: 73–74. Mar., 1918.—Data obtained largely through communications from P. R. Dupont, for many years curator of the Botanical Station at Mahé in the Seychelles. Palms constitute the most

striking feature of the Seychelles vegetation, and they conspicuously overtop most of the other trees. Endemism in palms reaches its culmination in these islands, some species being confined to a single island; even the genera are much restricted, hardly any of them being found outside these archipelagoes. Interesting notes are given concerning Lodoicea, the best known of the Seychelles palms.

1443. Jeffreys, Harold. *Ecology as a subject for teaching.* New Phytol. 17: 51-53. 1918.—See Bot. Absts. 1, Entry 463.

1444. Korstian, Clarence F., and Frederick S. Baker. **Precipitation as a factor limiting the distribution of Pinus ponderosa scopulorum.** Jour. Ecol., 6: 96. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—After compiling data from a number of cooperative Weather Bureau stations within the range of the Rocky Mountain variety of western yellow pine (*Pinus ponderosa scopulorum*) it is concluded that the amount of precipitation during the summer is a potent factor in limiting its distribution, especially in determining its lower limits and in limiting its occurrence in the Great Basin to small isolated areas and scattered individuals. Annual precipitation curves for stations within the range of the variety show a decided crest occurring during June, July or August, while such a crest is practically lacking for Great Basin stations which otherwise appear comparable.—*C. F. Korstian and F. S. Baker.*

1445. Medsger, Oliver P. **Two months in the southern Catskills.** [New York] Mem. Torr. Bot. Club. 17: 294-300. June, 1918.—A brief account of collections and notes on the vegetation of Slide Mountain, Ulster County, N. Y., and neighboring mountains. Of interest chiefly because this mountain is the highest in the region within 100 miles of New York, and there are noted some altitudinal records for the occurrence of certain species of flowering plants, and types of vegetation from 1000 to 4250 feet, the latter being the summit altitude of Slide Mountain. Among the plants noted are *Picea rubra* in a virgin forest, *Sorbus americana* showing much leaf variation, numerous ferns including *Onoclea Struthiopteris*, *Camptosorus Braunii*, *Aspidium Goldianum* and *Botrychium lanceolatum*, and many typical northern species such as *Acer pennsylvanicum*, *Clintonia borealis*, and *Chiogenes hispidula*.—*Norman Taylor and Geo. D. Fuller.*

1446. Pearsall, W. H. **On the classification of aquatic plant communities.** Jour. Ecol. 6: 75-83. Mar., 1918.—The writer reviews the attempts at classification of aquatic plant communities on the basis of (1) growth form, (2) habit and (3) succession, and expresses his agreement with the last. The development of the succession in aquatic habits is controlled principally by the rate of sedimentation. It is further emphasized that there is no fundamental distinction between aquatic and fen stages, the top number of the aquatic stages being the pioneer community in the fen series. The application of the terminology of Clement's "Plant Succession" to such communities is also discussed and found to be in harmony with Pearsall's ideas, and applicable to the examples cited from English lakes. The principal habitat factors are shown to be: (1) Large variations in the dissolved mineral and organic contents of the water; (2) Variations in the amount and type of sediments deposited and; (3) The physical and chemical nature of the primitive lake floor.

It is concluded that aquatic plants bear no markedly dissimilar relation to the substratum than do plants of terrestrial habit and this is taken as justifying the inclusion of aquatic and terrestrial communities in one unbroken succession. The proposed system of classification therefore makes succession the fundamental idea with growth forms and habitat as factors of importance in considering the distribution of communities and in determining their status. —*Geo. D. Fuller.*

1447. Pearsall, W. H. **The aquatic and marsh vegetation of Esthwaite Water.** Jour. Ecol. 5: 180-202. 1917. *Ibid.* 6: 53-74. *Fig. 12.* Mar., 1918.—This is a detailed study of the vegetation of a narrow lake situated in the Lake District of England. Quantitative data

are presented of depth, composition of water, character of deposits and light intensities at various depths and these data are made graphic in maps and curves. The composition, distribution and succession of the various aquatic communities up to the reed swamp are carefully studied and mapped. The terrestrial hydrophytic vegetation is placed in two subdivisions, the marsh with zonal plant communities bearing no relation to the aquatic succession and the fen composed of communities succeeding aquatic plants as the mud gets above water level. The former contains a variety of swamp associations of the usual type including herbaceous and forest communities, while in the latter three series are distinguished depending upon the rate of sedimentation. All are supposed to begin with the reed swamp and all include associations of various grasses and sedges, while the area of moderate sedimentation has in addition associations known as "carrs," in which shrubs mingle with the herbaceous species of the fen. The "open carr" trees and shrubs form thickets in the fen, *Salix cinerea, S. purpurea, Alnus glutinosa* and *Betula tomentosa* being most abundant. The same species form the succeeding "closed carr" and with *Alnus rotundifolia, Rhamnus Frangula* and *Myrica Gale* constitute a dense swamp forest. Emphasis is placed upon the variations in succession due to different rates of sedimentation and interesting observations presented upon the relation of fens to moors.—*Geo. D. Fuller.*

1448. Watson, W. **Cryptogamic vegetation of the sand dunes of the west coast of England.** Jour. Ecol. 6: 126–143. *3 fig.* June, 1918.—The dunes studied are those of the Devon and Somerset shore and it is shown that their most abundant plants are often mosses or lichens. Such species as *Tortula ruraliformis, Camptothecium lutescens, Brachythecium albicans, Cladonia furcata, Peltigera canina* and *P. rufescens* being characteristic of unstable dunes. In brackish hollows associations of *Riccia crystallina* occur, wet hollows are often occupied by Harpidia (*Hypnum*) association and moist depressions by a Brya (*Bryum*) association. Other less important communities occur in various situations. Of all these complete lists of species are given and it is noted that while many of the bryophytes on the dunes have xerophytic characters none can be called xerophytes.—*Geo. D. Fuller.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

[Unsigned abstracts are by the editor.]

1449. Andrews, E. F. **Agency of fire in propagation of longleaf pines.** Bot. Gaz. **64**: 497–508. Dec., 1917.—Relates the history of two groups of longleaf pine (*Pinus palustris*), which he observed at the upper and northern limits of the species on Lavender Mountain, Georgia, as evidence of the agency of fire in the propagation of this species. One group was burned over in 1915, while the other had not suffered from fire at any time as far as could be seen. Both "plots" were strictly comparable as to soil, and were located on opposite sides of a ravine. In 1913, when the first observations were made both were evenly covered with a dense growth consisting of *Pteris aquilina, Tephrosia virginica* together with species of *Andropogon* and sedges. A part of the area that was later burned over had been cleared at one time but on account of the steepness of the slope had been allowed to revert again to native brush and weeds. In 1913 there were five pines visible on this area and four on the other "control." In 1915 soon after a fire 34 longleaf pines were found in the burned area which had been generally invisible before on account of the dense growth of weeds. The fire had swept away all the competing vegetation and left the area to the pines, whose leaves, though scorched and burned off, had sufficiently protected the growing tip to preserve the life of the trees. In the unburned area there were still 4 trees. In 1917, on the area that had been burned there were 66 trees, while on the other only 2 were left.

The evidence of the resistance of the pine seedlings to fire seems somewhat surprising at first, but it is confirmed by several rough experiments on the behavior of the seedlings in ground fires. These showed that the leaves were not at all inflammable and that they are so

arranged as to shield the growing point. To all appearances exposures as long as 8.5 minutes to a brisk fire of chips were not sufficient to cause death to seedlings a few years old.

In general, foresters have a tendency to condemn fires absolutely and such evidence as this deserves careful consideration. It must be noted however that two very important points have been omitted from the discussion. The first is that the reproduction was much the more vigorous in the first place on the burned plot because of the abandoned clearing where the pines found a congenial seed bed years before the fire (rather than any greater seeding toward the open as intimated in the article as the cause of the heavy reproduction there), and second, the resistance of the cambium to fire after the lower needles have dried or fallen was not investigated. Taking it as a whole, the kernel of the matter is found in the last sentence, the italics are the reviewers, ". . . . when forest fires, especially of the minor type known as 'ground fires' and 'brush fires,' occur *at not too frequent intervals*, the immunity of the pines enables them to take the lead in the work of reforestation, and through the gradual elimination of their rivals to become finally the sole possessors of the soil."—*F. S. Baker.*

1450. Blackman, V. H., and R. C. Knight. **A method of controlling the rate of air movement in transpiration experiments.** Ann. Bot. 31: 122, 218. Apr., 1917.—This article deals with a device to produce uniform air currents by means of a fan and a horizontal flue for use in experiments on the rate of transpiration. The usual methods of investigation in still air have not proved satisfactory on account of the difficulty in showing that the air is really still by periodic observations of the speed of air in the vicinity of the plant. The elimination of air currents and other external factors in these experiments by considering relative transpiration rather than absolute transpiration, i.e., the ratio between transpiration by the plant and evaporation from an atmometer, is not altogether satisfactory since the response of the plant and that of the atmometer to air currents are not proportional.

The device described is as follows:—To obtain the steady movement of air which was desired, a special 'air-flue' was constructed, by which the plant could be protected from chance air currents, and at the same time subjected to a current of constant velocity, the velocity being variable at will. The apparatus consisted of a wooden box 2.25 metres long and 60 cm. in height and breadth. In one end, A, is a circular aperture to accommodate the revolving blades of a fan. The other end, B, of the flue is open, and the four walls are extended by means of bent metal sheets to form a bell mouth, so as to reduce to a minimum the formation of eddy currents at the edges of the opening and the consequent irregularities in the air movement through the flue. Near the center of the flue a section of the roof and sides is replaced by sheets of plate-glass; it is in this section, which is 60 cm. long, that the plants under observation are placed. The glass sheet at the top is divided in two, parallel to the long axis of the flue, and the two parts slide in and out. The front sheet also slides up to facilitate the manipulation of the apparatus or plant inside. This sheet is provided with a small, sliding door, 18 cm. square, which is convenient for minor operations not requiring the removal of the whole sheet. The woodwork is painted white so that the light may not be unduly reduced. Air is drawn through the flue by an electrically driven fan working in the aperture. Several fans and motors have been tried, but during long-period experiments it was found that the ordinary fan motor is not sufficiently constant in speed but tends to slow down slightly. The most satisfactory motor was found to be one with a governing mechanism. With this arrangment slow air currents, as low as 5 metres per minute, which have been mostly used, are easily obtainable.—The speed of the air current is estimated by means of an anemometer except in the case of very low speeds, when the rate of movement of smoke through the flue is timed by a stopwatch.—Air movement was tested by atmometer readings under constant conditions of temperature and humidity, and the results of an experiment carried out in a dark room show great regularity and small variation in half-hour periods.—The apparatus has been used and found satisfactory for air movements up to a speed of 25 metres per minute, although the higher speeds are generally not convenient for transpiration experiments. It is stated that by tests of atmometers it has been found desirable to use as high a speed as possible since greater regularity is obtained in this way.—*E. R. Hodson.*

1451. Butterwick, A. J. **Manufacture of matches in Rangoon.** Indian Forester **44:** 410–17. Sept. 1918.—Of thirteen species tried for matches only Letpon (*Bombax malabaricum*) and Shuwbyu (*Sterculia foetida*) were found suitable. A description is given of the methods of manufacture.—*Edw. N. Munns.*

1452. Griffin, Alfred A. **Influence of forests upon the melting of snow in the Cascade Range.** Monthly Weather Rev. **46:** 324–327. July 1918.—A study was made in 1916 and 1917 of snow melting in the open and in the forest of three areas on the Columbia River at elevations of around 2000 feet, 3000 feet, and 6500 feet. The water value of the snow cover retained by the forest areas amounted to a mean of 7.5 inches lasting on the average 17 days, *at some forested stations for more than 42 days. Drifting occurred only on the higher ridges* and chiefly in the open though the late snow banks in the forest resembled drifts. Because of the retention of snow on the crowns of trees and the resulting increased evaporation, snow cover reached a greater depth in the open than in the forest. Under dense forest conditions, the depth of snow retained was greater than in the open forest, at least during the latter part of the melting season. The snow remaining in the forested areas at the time the open stations became bare, was equal to 7.5 inches of water, or 30 per cent. of the maximum snow cover. With the forest areas at higher altitudes and with stations located so as to prevent completely the influence of open areas on the forested stations, and vice versa, the effect was found to be noticeably greater than this. The snow retained in the forest after the open ground was bare was the equivalent of 400 acre-feet of water per square mile, sufficient to supply 150 acres of irrigable agricultural land for the entire season. The effect of the forest cover is to spread this 400 acre-feet of retained snow water through a period of 17 days, important in reducing the crest of the flood and in increasing the minimum flow during low water periods. No records of stream flow from these areas were made.

An unusual factor in delaying melting in the Douglas fir type of forest is the protection given by the irregular layer of even very slight bits of moss, twigs, bark and other litter weathered from the trees. These fragments, which in the open would materially hasten melting by absorbing solar heat, in the forest serve as an effective insulation from the warm air currents above the snow. In the more open forest this effect is less prominent.—*Edw. N. Munns.*

1453. Hofmann, J. V. **Natural regeneration of conifers in the Pacific Coast forests of the United States.** Jour. Agric. Res. **11:** 1–26. Oct. 1917. [Abstract by Nature in Indian Forester **44:** 234–5. May 1918].—Reproduction in the Pacific Coast conifers after a fire depends more upon the seed stored in the surface soil and unburned litter than upon seed from the nearest forested area. Succession is the replacement of the forest almost immediately by the same species as in the original stand and usually in the same proportion. A comment by the editor of *Indian Forester* brings out that this is known to be the case in Indian forests. Severe fires in hardwoods, consisting of oaks, chestnuts, magnolias, and other species, are followed by the replacement of an almost pure forest of *Magnolia campbellii.*—*Edw. N. Munns.*

1454. Narasimhan M. J. **A preliminary study of root-nodules of Casuarina.** Indian Forester, **44:** 265–268. June, 1918.—Casuarina has been successfully cultivated in southern India on many of the wild waste lands. It thrives well on poor, sandy soils, in many places growing luxuriously and aiding greatly in preventing the spreading of dunes. So successful has this been that sandalwood trees can now be grown and cultivated on these dunes. Root nodules were found on the *Casuarina glauca, C. Stricta* and *C. quadrivalvis*, many of them large and rather branchy; though soft at first they later became rather woody. Free culture of bacteria from these nodules was made and they were found to fix atmospheric nitrogen. An estimation of the liquid media 35 days after the culture was made showed an increase of 2.7 mg. of nitrogen per 100 cc. of the liquid. It appears that, apart from the usefulness of Casuarina trees in binding loose, sandy soils, the trees exert a very beneficial influence by improving the soil to such an extent that facilities are afforded for the succession of the inland flora.—*Edw. N. Munns.*

1455. ROGERS, C. G. **Big teak in Burma.** Indian Forester, 44: 417-19. Sept., 1918.—Records are given of some of the big teak trees in Burma; one tree having a circumference of 13 ft. 6 in. contained 861.9 cu. ft. of timber.—*Edw. N. Munns.*

1456. SCHLICH, SIR WILLIAM. **The forests of New Zealand.** Canadian For. Jour. 13: 1834. Aug. 1918.—A short account of the timber area and ownership in New Zealand is given, with the amount and value of the exports and imports of 1913. A considerale acreage has been planted to exotics.—*E. N. Munns.*

1457. SPARHAWK, W. N. **Effect of grazing upon western yellow pine reproduction in central Idaho.** U. S. Dept. Agric. Bull. 738. *81 p., 4 pl.* Dec., 1918.—A study was made of the effect of sheep grazing on a number of sample plots on three grazing allotments between 1912 and 1914. Sheep injure forest reproduction by browsing and by trampling. Slight browsing of the needles, of side branches, of the leader or of the bark does practically no damage to the tree, though when repeated it may result in stunted growth or the death of the tree. Severe browsing, as occurs around bed grounds, often kills the seedlings. Trampling usually is not serious. Damage to seedlings more than a year old was negligible, while as high as 100 per cent—an average of about 20 per cent for all plots—were killed when less than one year old. Western yellow pine (*Pinus ponderosa*) was injured the most by browsing, lodgepole pine (*P. contorta*) less so, and Douglas fir (*Pseudotsuga taxifolia*) least. White fir (*Abies concolor*) is practically never browsed. Of 1,782 seedlings killed, 73 per cent were less than a year old, and but 5 per cent were over 6 inches in height.—Injuries which did not result in death were greater late in the season than during the earlier period, due to drying of the forage as the season advanced. Those killed by grazing were greater earlier in the season than later, as the stem breaks more readily when succulent than after lignification has set in. Injury and death increased fairly constantly with increased intensity of grazing, though after a seedling's third year less than 1 per cent per year of the trees is killed by grazing of moderate intensity. More than three times as many seedlings are killed by other causes than by sheep. Drowth, winter-killing, rodents and birds, and fungus diseases, were the chief causes of death, while frost, rodents and birds are responsible for minor injuries. The benefits of sheep grazing to the forest are through the reduction of fire by the destruction of the inflammable material and the aid to natural forest reproduction, which is often overestimated. A number of suggestions for handling sheep grazing in this type of forest include the time to graze, the intensity of grazing permitted, and methods of handling stock. The latter includes herding, the laying out of driveways, salting, watering and bedding.—*Edw. N. Munns.*

1458. TAYLOR, NATHANIEL R. **Rivers and floods of the Sacramento and San Joaquin watersheds.** U. S. Dept. Agric., Weather Bur. Bull. 43. *92 p., illust., maps, diagrams.* June, 1918.—A discussion of the floods in the principal California watersheds from the earliest known up to the present, with gage heights and hydrographs for the main river tributaries. The increasing flood plane is due to increased height and strength of levees along the stream banks and to the increased and constant enlargment of reclamation areas. Erosion and debris from mining have built up the river beds and the streams are no longer as navigable as formerly.—*Edw. N. Munns.*

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

1459. ADAMETZ, L. **[Hereditary transmission of the "curly wool" character of Caracul sheep in crosses between the Caracul and Rambouillet breeds.]** Zeitschr. indukt. Abstamm. Vererb. 17: *161-202.* 1917.—Abst. in Exp. Sta. Rec. 38: 575. June 14, 1918.

1460. ANONYMOUS. **Citrus hybridization.** Jour. Heredity 9: 281. Oct., 1918.—Extensive and comprehensive hybridization of various varieties and species of citrus fruits was begun at Riverside, California in the spring of 1914.—*C. E. Myers.*

1461. ANONYMOUS. **Wanted photographs of twins.** Jour. Heredity 9: 262. Oct., 1918.

1462. BABCOCK, E. B. **Selecting corn seed.** California Agric. Exp. Sta. Circ. 180. *7 p., 3 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 434. April, 1918.

1463. BALL, E. D., AND B. ALDER. **Breeding for egg production. II. Seasonal distribution of egg production.** Utah Agric. Exp. Sta. Bull. 149. *71 p., 29 fig.* 1917.—Abst. in Exp. Sta. Rec. 37: 869–871. Feb. 28., 1918.

1464. BARRUS, MORTIER F. **Varietal susceptibility of beans to strains of Colletotrichum Lindemuthianum (Sacc. & Magn.) B. & C.** Phytopath. 8: 589–614. *5 pl.* Dec., 1918.—Between three and four hundred varieties of beans and related plants belonging to ten species of *Phaseolus*, to two species each of *Vigna* and *Dolichos* and to one species each of *Canavali, Vicia, Cyamopsis, Cicer, Pisum* and *Lathyrus*, were experimentally studied over period of eight years with regard to resistance and susceptibility to bean anthracnose, *Colletotrichum Lindemuthianum* (Sacc. & Magn.) B. & C. Anthracnose material for inoculation cultures was obtained from several distinct geographical sources, viz., Germany, Illinois, Louisiana, New York, etc. Reactions with the various hosts inoculated demonstrated practicability of recognizing all these geographically distinct cultures as belonging to two strains, morphologically and culturally indistinguishable. These were designated *alpha* and *beta*.—Six degrees of susceptibility of host to parasite were recognized, but this classification was more or less arbitrary and the classes not especially clear cut. From inoculation data on both field and greenhouse plantings, five groups of hosts were recognized: **ab**, varieties susceptible to both anthracnose strains; **aB**, varieties susceptible to strain alpha only; **Ab**, varieties susceptible to strain beta only; **AB**, varieties showing some resistance (quite marked in some cases) to both *alpha* and *beta* strains; **Miscellaneous**, varieties showing irregularities in susceptibility to both strains.—All attempts to break down host resistance and increase susceptibility by means of heavy fertilization with sodium nitrate, by heavy continued watering, by shading, by drought, and by mechanical injuries to host just before inoculation were unsuccessful, though fully checked by untreated plants. Varieties of beans most resistant to both strains are Wells' Red Kidney, White Marrow and White Imperial, and these are recommended as foundation stocks for producing other desirable resistant commercial varieties. Extensive infection with both strains was secured on teparies (*P. acutifolius* var. *latifolius* G. F.) and black-eyed beans (*Vigna sinensis* (L.) Endl., slight to fair infection on numerous varieties of Lima beans (*P. lunatus*), and slight to no infection on varieties of *Pisum, Dolichos, P. aureus* Roxb., *P. multiflorus* Willd., *P. aconitifolius* Jacq., *Cyamopsis, Canavali*, and sweet peas.—Full descriptions are given of methods, sources of host and parasite material and tables of host varieties tested with their degree of resistance or susceptibility to both strains of anthracnose.—*O. E. White.*

1465. BERGSTRÖM, SVERKER. **Sur les moments de la fonction de correlation normale de *n* variables. [On the moments of the function of normal correlation of *n* variables.]** Biometrika 12: 177–183. Nov., 1918.—See Bot. Absts. 2, Entry 22.

1466. BLARINGHEM, L. **Les complexes végétaux et leurs disjonctions par la vieillesse. [Vegetable complexes and their resolution as a result of aging.]** Ann. inst. Pasteur 32: 60–70. 1918.—Exposition of view that "disjonction" is brought about by physical-chemical conditions incident to age. Applied to bud sports of such chimeras as *Cytisus Adami*, to vegetative segregations of parental characters in known hybrids, to cases of degeneration of plants propagated vegetatively (potato, pear, grape, etc.) and to maturity of such parasitic fungi as smuts and rusts.—Changes in environmental conditions are credited with much influence in

inducing "disjonctions." Reports that a well known flour wheat of Russia changes to durum wheat when grown in Algeria and to still different species (*T. turgidum*) when grown in France, the "disjonction" being induced by differences in soil, heat and humidity which especially influence transpiration.—Maintains that hybrids are frequently mosaics of tissues characteristic of the parents, such condition being reported for hybrid *Triticum monococcum* × *T. durum*. [See Bot. Absts. 1, Entry 1173.]—*A. B. Stout.*

1467. BRANFORD, R. **Some breeding statistics.** Agric. Jour. India **12**: 573–578. 1917.—*Abst. in Exp. Sta. Rec. 38: 574. June 14, 1918.*

1468. BROILI, J. **Die Anwendung des Fruchtgürtels bei der Kartoffel. [The use of the fruit-girdle in potatoes.]** Zeitschr. Pflanzenzüchtung **6**: 57–60. Mar., 1918.—Describes partially successful attempt to increase berry-production in potatoes, by wrapping stem tightly to check descent of food materials.

1469. COBB, FRIEDA, AND H. H. BARTLETT. **Purple bud sport on pale-flowered lilac (Syringa persica).** Bot. Gaz. **65**: 560–562. *1 fig.* 1918.—Abst. in Exp. Sta. Rec. **39**: 244. 1918. [See Bot. Absts. 1, Entry 216.]

1470. COLLINS, E. J. **Potato breeding.** Gard. Chron. **64**: 226. Dec. 7, 1918.—Lists numerous varieties that are practically synonymous or at least indistinguishable and suggests that pedigree of each new variety be fully and accurately disclosed.—*Richard Wellington.*

1471. COULTER, JOHN M., AND MERLE C. COULTER. **Plant genetics.** *19 × 13 cm., ix + 214 p., 40 fig.* Univ. of Chicago Press, Chicago, Illinois. July, 1918.

1472. CROZIER, W. J. **Assortive mating in a nudibranch Chromodoris zebra Heilprin.** Jour. Exp. Zoöl. **27**: 247–292. *23 fig.* Nov. 20, 1918.—Large individuals mate chiefly with other large ones, small with small. Cause of assortive mating appears to be mechanical. Number of eggs laid at one time is proportional to size of body. Since sperm injected by small individual might not suffice to fertilize all eggs of large one, assortive mating is adaptive, in that larger numbers of fertilized eggs are thereby produced.—*A. F. Shull.*

1473. DAVIS, B. M. **Some inter- and back-crosses of F_1 Oenothera hybrids.** Genetics **2**: 155–185. *6 fig.* 1917.—Abst. in Exp. Sta. Rec. **38**: 28. Jan., 1918.

1474. DAVIS, BRADLEY MOORE. **The segregation of Oenothera brevistylis from crosses with Oenothera Lamarckiana.** Genetics **3**: 501–533. *7 fig.* Nov., 1918.

1475. DETLEFSEN, J. A. **Fluctuations of sampling in a Mendelian population.** Genetics **3**: 599–607. Nov., 1918.

1476. DE VRIES, HUGO. **Kreuzungen von Oenothera Lamarckiana mut. velutina. [Crosses of Oenothera Lamarckiana mut. velutina.]** Zeitschr. indukt. Abstamm. Vererb. **19**: 1–38. Mar., 1918.—See Bot. Absts. 2, Entry 933.

1477. DE VRIES, HUGO. **Twin hybrids of Oenothera Hookeri T. and G.** Genetics **3**: 397–421. Sept., 1918.

1478. DE VRIES, HUGO. **Oenothera rubrinervis, a half mutant.** Bot. Gaz. **67**: 1–26. Jan. 1919.—See Bot. Absts. 2, Entry 398.

1479. DUERDEN, J. E. **Absence of xenia in ostrich eggs.** Jour. Heredity **9**: 243–245. Oct., 1918.—Reviewing literature, it is well attested that seeds obtained from a cross-pollinated plant frequently show influence of the fertilizing pollen, but evidence of xenia in

poultry is not well authenticated. Recent work by author shows that eggs of North African ostrich, when fertilized by sperms of South African ostrich, a distinct species with eggs strikingly contrasting in size and proportions, and number and extent of pores, and the reciprocal, indicate no evidence of xenia. F_1 ostriches from these crosses reveal intermediate characters in all respects, except that the bald head patch occurring in the northern and absent in the southern is dominant. Eggs of F_1 birds are like those of southern ostrich in size and shape, but pittings are intermediate in number and depth.—*R. K. Nabours.*

1480. Durst, C. E. **Tomato selection for Fusarium resistance.** Phytopath. **8**: 80. 1918. [See Bot. Absts. 1, Entry 93.]

1481. Ebstein, Dr. Erich. **Zur Polydaktylie in einen südarabischen Herrschergeschlecht.** **[On polydactyly in a south Arabian family of rulers.]** Die Naturwiss. **4**: 603-604. 1915.—Rev. by Hermann W. Siemens in Zeitschr. indukt. Abstamm. Vererb. **19**: 207-208. June, 1918.

1482. Embody, G. C. **Artificial hybrids between pike and pickerel.** Jour. Heredity **9**: 253-256. *Fig. 4-5.* Oct., 1918.—See Bot. Absts. 2, Entry 25.

1483. Federley, Harry. **Die Vererbung des Raupendimorphismus von Chaerocampa elpenor L.** **[Inheritance of pupal dimorphism in Chaerocampa elpenor L.]** Öfversigt af Finska Vetenskaps- Soc. Förhandlingar **58**: 13. 1915-16.—Rev. by F. Lenz in Zeitschr. indukt. Abstamm. Vererb. **19**: 215-216. June, 1918.

1484. Folsom, Donald. **The influence of certain environmental conditions, especially water supply, upon form and structure in Ranunculus.** Physiol. Res. **2**: 209-276. *24 fig.* Dec., 1918.—Individuals of two plastic species, *Ranunculus sceleratus* and *R. abortivus*, were grown with different degrees of water supply. All plants were descended from single individual of each species. Direct relation found in first generation between water supply and many structural features, largely disappeared in second generation grown under somewhat different conditions. Ratio of leaf area under amphibious and xerophytic conditions was in one case (second generation of *R. sceleratus*) 17.8 : 2.7. A small third generation of this species to test for heritability of water effects on laminara rea revealed no transmission of such effects. [See Bot. Absts. 2, Entry 1484.]—*J. P. Kelly.*

1485. Gernert, W. B. **Aphis immunity of teosinte-corn hybrids.** Science **46**: 390-392. 1917.—Abst. in Exp. Sta. Rec. **38**: 561. June 14, 1918.

1486. Goldschmidt, R. **Experimental intersexuality and the sex problem.** Amer. Nat. **50**: 705-718. *3 fig.* 1916.—Abst. in Exp. Sta. Rec. **38**: 65. Jan., 1918.

1487. Goldschmidt, R. **On a case of facultative parthenogenesis in the gipsy moth (Lymantria dispar), with a discussion of the relation of parthenogenesis to sex.** Biol. Bull. Woods Hole **32**: 35-43. 1917.—Abst. in Exp. Sta. Rec. **38**: 261. April 22, 1918.

1488. Goodale, H. D. **Winter cycle of egg production in the Rhode Island Red breed of the domestic fowl.** Jour. Agric. Res. **12**: 547-574. 1918.—Abst. in Exp. Sta. Rec. **38**: 876. Aug. 9, 1918.

1489. Goodspeed, T. H., and R. E. Clausen. **An apparatus for flower measurement.** Univ. California Publ. Bot. **5**: 435-437. *Pl. 64, fig. 1.* 1918.

1490. Green, S. N., and J. G. Humbert. **Disease-resistant varieties of tomatoes.** Monthly Bull. Ohio Agric. Exp. Sta. **3**: 43-48. *3 fig.* 1918.—Characteristics which tend to immunity are believed to be cumulative and usually repeated selections are necessary to

secure immunity to high degree. Resistance and immunity most frequently found in commercially unimportant strains or varieties.—Ohio work started in 1911 by selection of tomatoes for resistance to *Fusarium* wilt. Determination of possible resistance was made with seedlings, by sowing in infected soil. Subsequent field tests of strains showing resistance in seed bed gave only one strain that was completely resistant, but its yield was no greater than non-resistant commercial strains, and it was late in maturing. One strain gave an immunity of 87 per cent and was quite satisfactory with respect to earliness and yield. It will be made basis for further work. [Abst. in Exp. Sta. Rec. 38: 843. Aug. 9, 1918.]—*C. E. Myers.*

1491. HAECKER, V. **Die entwicklungsgeschichtliche Vererbungsregel in der Völkerkunde.** [The developmental law of inheritance in anthropology.] Zeitschr. indukt. Abstamm. Vererb. 19: 73–78. Mar., 1918.

1492. HAGEDOORN, A. C., AND A. L. HAGEDOORN. **Rats and evolution.** Amer. Nat. 51: 385–418. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 185. June, 1918.

1493. HAGEDOORN-LA BRAND, A. C., AND A. L. HAGEDOORN. **Parthenogenesis in higher plants.** Teysmannia 27: 643–656. *1 pl.*, 1917.—Abst. in Exp. Sta. Rec. 38: 331. Mar., 1918.

1494. HALSTED, B. D. **Colors in vegetable fruits.** Jour. Heredity 9: 18–23. 1918.—Abst. in Exp. Sta. Rec. 38: 443. April, 1918. [See Bot. Abst. 1, Entry 25.]

1495. HALSTED, B. D. **Reciprocal breeding in tomatoes.** Jour. Heredity 9: 169–173. 1918.—Abst. in Exp. Sta. Rec. 39: 140. Aug., 1918. [See Bot. Absts. 1, Entry 26.]

1496. HALSTED, B. D. **Weight of seeds as related to their number and position in the pod.** Torreya 17: 102–103. 1917.—Abst. in Exp. Sta. Rec. 38: 535–536. June 14, 1918.

1497. HANSEN, ALBERT A. **Petalization in the Japanese quince.** Jour. Heredity 9: 15–17. *2 fig.* Jan., 1918.—Abst. in Exp. Sta. Rec. 38: 446. April, 1918. [See Bot. Absts. 1, Entry 27.]

1498. HARPER, R. A. **Organization, reproduction and inheritance in Pediastrum.** Proc. Amer. Phil. Soc. 57: 375–439. *Pl. 5–6, fig. 35.* 1918.—See Bot. Absts. 2, Entries 27, 60.

1499. HARRIS, J. A. **On the distribution of abnormalities in the inflorescence of Spiraea Vanhouttei.** Amer. Jour. Bot. 4: 624–636. *2 pl.* 1917.—Abst. in Exp. Sta. Rec. 39: 30. July, 1918.

1500. HARRIS, J. A., A. F. BLAKESLEE, AND W. F. KIRKPATRICK. **Inter-periodic correlation in the egg production of the domestic fowl.** Proc. National Acad. Sci. U. S. Amer. 3: 565–569. *2 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 171–172. Feb., 1918.

1501. HAVAS, G. **A herefeléken és más növényeken elöforduló azonos rendelienességekröl.** [On similar cases of teratology in species of clover and in other plants.] Botanikai Közlemények 1917: 20–23. 1917.—German abst. in Zeitschr. Pflanzenzüchtung 6: 50–51. Mar., 1918.

1502. HAYES, H. K. **Inheritance of a mosaic pericarp pattern color in maize.** Genetics 2: 261–281. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 332. Mar., 1918.—Also in *ibid.* 38: 531–532. June 14, 1918.

1503. HAYES, H. K. **Natural crossing in wheat.** Jour. Heredity 9: 326–330, 334. *fig. 14–15.* Nov., 1918.—Indications of natural crossing in wheat were observed by author in 1916 and 1917 in nursery wheat plots at University Farm, Minnesota Agricultural Experiment Station

d conclusion was then drawn that natural crossing in wheat was more common in the North-
st than had formerly been supposed or that seasons of 1915, 1916 were very favorable for oss pollination. Results now reported are similar to those obtained before and show that in 17 there was also considerable natural crossing. In Durum and Emmer no crossing was served but number of plants grown was relatively small (120 altogether). Observed crosses *Triticum vulgare* lines averaged 1.3 per cent and as cross pollination doubtless occurred as ten between plants of same variety as between different sorts conclusion is reached that tural crossing in 1917 was at least 2 to 3 per cent.—*C. A. Gallastegui*

1504. Hayes, H. K., and A. C. Arny. **Experiments in field technique in rod row tests.** ur. Agric. Res. 11: 399–419. 1917.—Abst. in Exp. Sta. Rec. 38: 429–430. April, 1918.

1505. Hayes, H. K., and D. F. Jones. **The effects of cross- and self-fertilization in natoes.** Connecticut State Agric. Exp. Sta. Rept. 1916: 305–318. *2 pl.* 1916.—Abst. in p. Sta. Rec. 38: 241–242. April 22, 1918.

1506. Hayes, H. K., and D. F. Jones. **First generation crosses in cucumbers.** Connec- ut State Agric. Exp. Sta. Rept. 1916: 319–322. *1 pl.* 1916.—Abst. in Exp. Sta. Rec. 38: l. April 22, 1918.

1507. Hector, G. P. **Observations on the inheritance of anthocyan pigment in paddy ieties.** Mem. Dept. Agric. India, Bot. Ser. 8: 89–101. *2 pl.* 1916.—Abst. in Exp. Sta. c. 38: 29. Jan., 1918.

1508. Hertwig, Paula. **Keimesschädigung durch physikalische und chemische Ein- ffe.** [Injury of the germcells by physical and chemical means.] Zeitschr. indukt. Abstamm. rerb. 19: 79–88. Mar., 1918.

1509. Hodgson, Robert W. **An interesting bud-sport in the Washington navel orange.** ur. Heredity 9: 301–303. *2 fig.* Nov., 1918.—See Bot. Absts. 2, Entry 31.

1510 Holden, H. S., and Dorothy Bexon. **Observation on the anatomyof teratological dlings. 1. On the anatomy of some polycotylous seedlings of Cheiranthus Cheiri.** Ann. t. 32: 513–530. *17 fig.* Oct., 1918.—See Bot. Absts. 1, Entry 1330; 2, Entry 32.

1511. Holmes, S. J., and C. M. Doud. **The approaching extinction of the Mayflower de- endants.** Jour. Heredity 9: 296–300, 335. Nov., 1918.—See Bot. Absts. 2, Entry 414.

1512. Horsfeld, F. H. **Longevity in Lily pollen.** Jour. Heredity 9: 90. Feb., 1918.— st. in Exp. Sta. Rec. 38: 446. April, 1918. [See Bot. Absts. 1, Eutry 32.]

1513. Humbert, E. P. **Inheritance of oil in cotton.** Science 45: 411. 1917.—Abst. in p. Sta. Rec. 38: 533. June 14, 1918.

1514. Isserlis, L. **On a formula for the product-moment coefficient of any order of a nor- l frequency distribution in any number of variables.** Biometrika 12: 134–139. Nov., 1918.

1515. Isserlis, L. **Formulae for determining the mean values of products of deviation of xed moment coefficients in two to eight variables in samples taken from a limited population.** ometrika 12: 183–184. Nov., 1918.—See Bot. Absts. 2, Entry 418.

1516. Jelinek, J. **Beitrag zur Technik der Weizenbastardierung.** [Contribution to the hnique of wheat crossing.] Zeitschr. Pflanzenzüchtung 6: 55–57. Mar., 1918.

1517. Jennings, H. S. **The numerical results of diverse systems of breeding, with respect two pairs of characters, linked or independent, with special relation to the effects of linkage.** netics 2: 97–154. 1917.—Abst. in Exp. Sta. Rec. 38: 268–269. April 22, 1918.

1518. Jennings, H. S. **Observed changes in hereditary characters in relation to evolution** Jour. Washington Acad. Sci., 7: 281–301. May, 1917.—Abst. in Jour. Roy. Microsc. Soc. **1918**: 37. Mar., 1918.

1519. Jones, D. F. **The effects of inbreeding and crossbreeding upon development.** Connecticut Agric. Exp. Sta. Bull. 207. *100 p., 12 pl.* New Haven, 1918.—See Bot. Absts. 2 Entry 34.

1520. Kempton, J. H. **A correlation between endosperm color and albinism in maize.** Jour. Washington Acad. Sci. 7: 146–149. 1917.—Abst. in Exp. Sta. Rec. 38: 28–29. Jan., 1918.

1521. Kempton, J. H. **The ancestry of maize.** Jour. Washington Acad. Sci. 9: 3–11. Jan. 4, 1919.—See Bot. Absts. 2, Entry 35.

1522. Kiessling, L. **Über eine Mutation in einer reinen Linie von Hordeum distichum L.** Zeitschr. indukt. Abstamm. Vererb. 19: 145–159. June, 1918.

1523. King, H. G. **Fasciated vegetable marrow.** Gard. Chron. 64: 147. *fig. 57.* Oct. 12, 1918.—One branch of vegetable marrow vine growing on manure heap was fasciated, attaining width of five inches. Four fruits developed from eight pistillate flowers which appeared at node. Heredity of form has not yet been tested.—*John Bushnell.*

1524. Küster, E. **Über Anthocyanzeichnung und Zellenmutation. [On anthocyan pattern and cell mutation].** Ber. Deutsch. Bot. Ges. 33: 536–537. 1915.—Rev. by E. Stein in Zeitschr. indukt. Abstamm. Vererb. 19: 220–221. June, 1918.

1525. Küster, E. **Die Verteilung des Anthocyans bei Coleus-Spielarten. [The distribution of anthocyan in Coleus varieties.]** Flora 10: 1–33. 1917.—Rev. by E. Stein in Zeitschr. indukt. Abstamm. Vererb. 19: 220–221. June, 1918.

1526. La Marca, F. **Un nouvel hybride de greffe. [A new graft hybrid.]** Compt. Rend. Paris 166: 647–649. 1918.—Abst. by F. F. Blackman in Physiol. Absts. 3: 293. July-Aug., 1918. Also by J. Arthur Thomson in Jour. Roy. Microsc. Soc. **1918**: 318. Sept., 1918. [See Bot. Absts. 1, Entry 911.]

1527. Lancefield, D. E. **Scarlet, an autosomal eye color identical with sex-linked vermilion.** Biol. Bull. 35: 207–210. Oct., 1918.—Scarlet is a new mutant eye color in *Drosophila melanogaster*, in third chromosome approximately 3 units to left of dichaete. Scarlet is closely similar to old mutant, vermilion, which is sex-linked. Data of Richards [See Bot. Absts. 1, Entry 1287.] and Lancefield taken together put gene for scarlet 3.5 to left of dichaete. Appearing simultaneously with scarlet was another mutant eye color similar to pink. Its gene is in second chromosome and has double effect, producing also a bubble appearance in wings. This stock when pure, had low viability and died out before its gene could be definitely located.—*C. B. Bridges.*

1528. Lécaillon, A. **Sur les caracters speciaux que presentent, aux differents stades de leur developpement, les Bivoltins accidentels qui se produisent chez le Bombyx du Mûrier. [On the special characters presented at different stages of development and the accidental bivoltins produced by them in the silkworm (Bombyx).]** Compt. Rend. 165: 683–685. 1917.—Abst. in Jour. Roy. Microsc. Soc. **1918**: 48. Mar., 1918.

1529. Lippincott, W. A. **A fowl's breeding value.** Country Gent. 82: 10–11. *8 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 775. June, 1918.

1530. Lippincott, William A. **The case of the blue Andalusian.** Amer. Nat. 52: 95–115. Feb.-Mar., 1918.—Abst. by J. Arthur Thomson. Jour. Roy. Microsc. Soc. **1918**: 300. Sept., 1918. [See Bot. Absts. 1, Entry 36.]

1531. Lundberg, J. F., and Å. Åkerman. **Observations on the color of seeds originating from spontaneous crossing between two forms of Phaseolus vulgaris.** Bol. Agric. [Sao Paulo] 18: 712–726, 793–807, 928–947. 1917.—Abst. Exp. Sta. Rec. **38**: 539. June 14, 1918.

1532. McArthur, Clifford L. **Transmissibility of immunity from mother to offspring in hog cholera.** Jour. Infect. Dis. **24**: 45–50. Jan., 1919.—See Bot. Absts. 2, Entry 686.

1533. Mac Bride, E. W., and Miss A. Jackson. **The inheritance of colour in the stick-insect.** Proc. Roy. Soc. 89: 109–118. 1915.—Rev. by Tine Tammes in Zeitschr. indukt. Abstamm. Vererb. **19**: 215. June, 1918.

1534. MacDowell, Edwin Carleton. **Bristle inheritance in Drosophila. II. Selection.** Jour. Exp. Zool. **23**: 109–146. *10 fig.* 1917.—Abst. in Jour. Roy. Microsc. Soc. **1918**: 53. Mar., 1918.

1535. McFadden, E. A. **Wheat-rye hybrids.** Jour. Heredity 8: 335–336. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. *38*: 735. June, 1918.

1536. Macoun, W. T. **Apple breeding in Canada.** Agric. Gaz. Canada **5**: 126–128. 1918. —Abst. in Exp. Sta. Rec. **38**: 446. April, 1918.

1537. Miyazawa, B. **Oomugi no mi no iro no iden ni tuite.** [**On the inheritance of the** ***fruit-color*** **of barley.**] *Bot. Mag. Tôkyô, 32: 308–310. Oct., 1918.—In a paper in Bot. Mag.*, Tôkyô, **30**: 359–369 (Nov., 1916) and **31**: 27–35 (Feb., 1917), entitled "[On the mosaic segregation of barley hybrids]" (in German and Japanese) author described segregation of black and and white grains in F_1 hybrids of the two barley races, "Sekitori" and "Golden melon," and explained the peculiar segregation on basis of vegetative segregation. He has now found, however, that his former observations were wrong in certain respects. He describes results of his new experiments and concludes that there is no vegetative segregation and that all his results are simply explainable on basis of xenia.—*S. Ikeno.*

1538. Molyneux, E. **Fasciation not inherent.** Gard. Chron. **64**: 210. Nov. 23, 1918.

1539. Moore, C. W. **Self-sterility.** Jour. Heredity **8**: 203–207. *3 fig.*, 1917.—Abst. in Exp. Sta. Rec. **38**: 426. April, 1918.

1540. Muller, H. J. **Genetic variability, twin hybrids and constant hybrids, in a case of balanced lethal factors.** Genetics 3: 422–499. *1 fig.* Sept., 1918.

1541. Nafziger, T. E. **How sorghum crosses are made.** Jour. Heredity **9**: 321–322. Nov., 1918.—See Bot. Absts. 2, Entry 39.

1542. Newman, H. H. **Hybrids between fundulus and mackerel. A study of paternal heredity in heterogenic hybrids.** Jour. Exp. Zool. *26*: 391–421. *Pl. 2.* Aug., 1918. [See Bot. Absts. 1, Entry 490.]—Abst. by W. D. Halliburton in Physiol. Absts. **3**: 457–458. Nov.-Dec. 1918.

1543. Nice, L. B. **Further observations on the effects of alcohol on white mice.** Amer. Nat. **51**: 596–607. 1917.—Abst. in Jour. Roy. Microsc Soc. **1918**: 42. Mar., 1918.

1544. Pearl, R. **The selection problem.** Amer. Nat. **51**: 65–91. 1917.—Abst. Exp. Sta. Rec. *38*: 64. Jan., 1918.

1545. Pearl, R. **Factors influencing the sex ratio in the domestic fowl.** Science **46**: 220. 1917.—Abst. in Exp. Sta. Rec. **37**: 868. Feb. 28, 1918.

1546. Pearl, R. **Studies on inbreeding. VII. Some further considerations regarding the measurement and numerical expression of degrees of kinship.** Amer. Nat. 51: 545–559. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 65. Jan., 1918. Also in Jour. Roy. Microsc. Soc. 1918: 44. Mar., 1918.

1547. Pearl, R. **Studies on inbreeding. VIII. A single numerical measure of the total amount of inbreeding.** Amer. Nat. 51: 636–639. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 269. April 22, 1918.

1548. Pearl, Raymond. **The sex-ratio in domestic fowl.** Proc. Amer. Phil. Soc. 56: 416–436. *3 fig.* 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 182. June, 1918.

1549. Philips, A. G. **Satisfactory method of pedigreeing fowls.** Reliable Poultry Jour. 24: 1107–1108, 1174–1176. *5 fig.* 1918.—Abst. in Exp. Sta. Rec. 38: 577. June 14, 1918. [See Bot. Absts. 2, Entry 40.]

1550. Pinney, Edith. **A study of the relation of the behavior of the chromatin to development and heredity in teleost hybrids.** Jour. Morphol. 31: 225–291. *14 pl., 88 fig.* Sept., 1918.—In cross between *Fundulus* ♀ and *Ctenolabrus* ♂ many abnormal mitoses occurred, taking form of exaggerated lagging of chromosomes which probably eliminated whole chromosomes from nucleus. Development to advanced stage was common, but only one individual reached stage of hatching. All embryos possessed maternal characteristics, none paternal. In reciprocal cross early mitotic behavior was prevailingly normal, but development ceased during gastrulation.—In *Ctenolabrus* ♀ × *Stenotomous* ♂ early mitotic figures were normal, but a number of vacuoles were in cytoplasm of egg. In large number of eggs of this experiment development proceeded to time of hatching, but none was hatched. Embryos were of maternal type. In reciprocal cross abnormal mitoses predominated, development ceased during gastrulation.—In *Ctenolabrus* ♂ × *Menidia* ♀ abnormal mitoses were frequent. Two embryos hatched. These were of maternal type. In reciprocal early mitoses were normal. Embryos reached advanced stage of development.—Cytological examination showed that egg of *Ctenolabrus* is better adapted to coöperate in mitosis with foreign sperm than eggs of other species used. Cleavage rhythm in hybrids is function of egg. Normal mitoses may occur in crosses in which development does not proceed far. Factor determining character of mitosis is quality of cytoplasm, not peculiarity of yolk of egg. Behavior of chromatin of spermatozöon during segmentation is independent of degree of relation existing between species crossed. With favorable cytoplasmic environment and compatible germ plasms success in development may be expected, but favorable cytoplasmic environment is not enough to bring about this result if germ plasms are not harmonious.—Cause of abnormal chromosome behavior is suggested as real cause of irregular development. In crosses in which nuclear behavior is abnormal greatest success in development occurs in more distantly related species, while in cases where mitotic behavior is normal converse is true. If cytoplasm of egg succeeds in entirely suppressing influence of spermatozoon, normal embryos of maternal type are obtained. There is yet no proof that nuclei of hybrid embryos of maternal type contain unchanged full number of maternal and paternal chromosomes. Appearance of paternal chromatophores indicates retention of paternal chromosomes. Apparent anomalies of first hybrids depend firstly upon effect of cytoplasm on sperm, secondly, reaction between two germ nuclei, and thirdly, variable specificity of effect of cytoplasm toward foreign spermatozoon.—*Mary T. Harman.*

1551. Popenoe, Paul. **Will morality disappear?** Jour. Heredity 9: 269–270. Oct., 1918.

1552. Pridham, J. T. **Proportion of grain to sheaf as a factor in wheat selection.** Agric. Gaz. New South Wales 28: 91–94. 1917.—Abst. in Exp. Sta. Rec. 38: 342. Mar., 1918.

1553. Raunkiaer, C. **Über die verhältnismässige Anzahl männlicher und weiblicher Individuen bei Rumex thyrsiflorus Fingerh.** Kgl. Danske Videnskabernes Selskab. Biol. Meddel. 1: 3–17. 1918.

1554. RAUNKIAER, C. **Om Løvsspringstiden hos Afkommet af Bøge med forskellig Løvspringstid. [On leaftime in the descendants of beeches with different leaf times.]** Bot Tidsskr. **36**: 197–203. 1918.—See Bot. Absts. 2, Entry 42.

1555. RAUNKIAER, C. **Über den Begriff der Elementarart im Lichte der modernen Erblichkeitsforschung. [On the concept of elementary species in the light of modern genetical investigations.]** Zeitschr. indukt. Abstamm. Vererb. *19: 225–240. 2 fig.* 1918.—See Bot. Absts. 2, Entry 41.

1556. RIDDLE, O. **The theory of sex as stated in terms of results of studies on the pigeon.** Anat. Rec. 11: 510. 1917.—Abst. in Exp. Sta. Rec. **37**: 868. Feb. 28, 1918.

1557. RIETZ, H. L., AND L. H. SMITH. **A statistical study of some indirect effects of certain selections in breeding Indian corn.** Jour. Agric. Research 11: 105–146. *24 fig.* 1917.—Abst. in Exp. Sta. Rec. **38**: 232–233. April 22, 1918.

1558. RITCHIE-SCOTT, A. **The correlation coefficient of a polychoric table.** Biometrika **12**: 93–133. Nov., 1918.—See Bot. Absts. 2, Entry 700.

1559. ROBBINS, R. B. **Some applications of mathematics to breeding problems.** Genetics *2*: 489–504. 1917.—Abst. Exp. Sta. Rec. **38**: 367. Mar., 1918.

1560. ROBBINS, RAINARD B. **Some applications of mathematics to breeding problems. III.** Genetics *3*: *375–389*. July, 1918.—General mathematical discussion of expectations in Mendelian population after n generations of breeding according to system indicated, when two linked character differences are involved. Systems of breeding considered include (a) random mating, (b) selection of dominants with respect to one of the linked characters, and (c) self-fertilization. To make formulae apply to independent characters, make linkage $r=1$.

1561. ROBBINS, RAINARD B. **Random mating with the exception of sister by brother mating.** Genetics **3**: 390–396. July, 1918.—Mathematical discussion of results of this particular type of breeding in case of monohybrid combination when character involved is independent of sex. Concludes that when brother and sister mating is omitted, progeny in succeeding generations approach fixed proportion of pure dominants, heterozygotes and recessives, as number of generations increases. When only two offspring are in typical family, limiting proportion has larger proportion of heterozygotes than in case of completely random mating, but if typical family contains more than two offspring, proportions of three types in limiting family are same as in random mating.

1562. ROEMER, TH. **Über die Befruchtungsverhältnisse verschiedener Formen des Gartenkohles (Brassica oleracea L). [On the fertilization relationship of different forms of garden cabbage (Brassica oleracea L)].** Zeitschr. Pflanzenzüchtung **4**: 125–141. 1918. Rev. by Richard Freudenberg in Zeitschr. indukt. Abstamm. Vererb. *19*: *222–223*. June, *1918*.

1563. SAUNDERS, EDITH R. **Studies in the inheritance of doubleness in flowers. II. Meconopsis, Althaea, and Dianthus.** Jour. Genetics **6**: 165–184. 1917.—Abst. Exp. Sta. Rec. **39**: 123. Aug., 1918.

1564. SAX, KARL. **The inheritance of doubleness in Chelidonium majus Linn.** Genetics **3**: 300–307. May, 1918.—Investigations on inheritance of doubleness in flowers of other plants briefly reviewed. Reciprocal crosses between a double and single-flowered "wild" plant gave in each case in F_2 approximately 1:1 ratio. In F_2, seed of F_1 singles gave 109 singles: 24 doubles, while seed of F_1 doubles gave in F_2, 6 singles: 105 doubles. Assuming the 6 F_2 singles from F_1 doubles to be contaminations, results indicate inheritance of doubleness in *Chelidonium* is due to one factor pair with doubleness recessive. Much variation in number of floral parts of double segregates, though no greater than in double ancestors. Negative correlation between petal and stamen number in F_2 is high, due to petalody.—*O. E. White*

1565. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus-fruit improvement: a study of bud variation in the Washington navel orange.** U. S. Dept. Agric. Bull. 623. *15 × 23 cm., 146 p., 19 pl., 16 fig.* 1918.

1566. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: a study of bud variation in the Marsh grapefruit.** U. S. Dept. Agric. Bull. 697. *112 p., pl.* 1–2, *14 fig.* 1918.

1567. Silver, Allen. **Two interesting hybrids.** Avic. Mag. **10**: 12–14. Nov., 1918.—Seven hybrids between Lesser Redpoll and Twite were bred; only one was reared. Characters of its parents are almost equally merged in it. Also reports and describes three hybrids between ♂ Goldfinch and ♀ Twite.—*L. J. Cole.*

1568. Sô, M., and Y. Imai, **On the xenia of the barley.** Bot. Mag., Tôkyô, **32**: 205–214. Oct., 1918.—Authors made some experiments on hybridization of barley similar to those of Miyazawa (see Bot. Absts. **1**, Entry 1537), and found that segregation in F_1 generation is explainable on basis of xenia, the results of their experiments being thus in perfect accordance with those newly obtained by Miyazawa.—*S. Ikeno.*

1569. Stomps, Th. J. **Über die verschiedenen Zustände der Pangene. [On the different states of the pangenes.]** Biol. Zentralbl. **1917**: 161–177. 1917.—German Abst. in Zeitschr. Pflanzenzüchtung **6**: 53. Mar., 1918.

1570. Stout, A. B. **Fertility in Cichorium intybus: The sporadic occurrence of self-fertile plants among the progeny of self-sterile plants.** Amer. Jour. Bot. **4**: 375–395. *2 fig.* 1917.—Abst. in Exp. Sta. Rec. **38**: 226. April 22, 1918.

1571. Stout, A. B. **Experimental studies of self-incompatibilities in fertilization.** Proc. Soc. Exp. Biol. and Med., **15**: 51–54. 1918.—Abst. by W. S[tiles) in Physiol. Absts. **3**: 299. July-Aug., 1918. [See Bot. Absts. **1**, Entry 939.]

1572. Tenopyr, Lilian A. **On the constancy of cell shape in leaves of varying shape.** Bull. Torrey Bot. Club **45**: 51–76. 1918.—[See Bot. Absts. **1**, Entries 72, 997.]—On basis of measurements for length-width ratios of leaf cells in *Campanula rotundifolia, Lobelia erinus,* two species of *Linum* and common type of *Cichorium intybus,* it is concluded that average cell size for given tissue for any species or variety is a fairly constant and hereditary character. Witloof variety of chicory had larger cells than type. Differences in shapes of leaves on same plant are independent of cell shapes and author states that they are "obviously due to heredity," and that hereditary size of organ is due to factors of periodicity regulating number and direction of cell divisions. [Abst. in Jour. Roy. Microsc. Soc. **1918**: 316–317. Sept., 1918.]—*James P. Kelly.*

1573. Tildesley, M. L. **Preliminary note on the association of steadiness and rapidity of hand with artistic capacity.** Biometrika **12**: 170–177. Nov., 1918.

1574. Trabut, L. **The hybrid origin of alfalfa.** Compt. Rend. Acad. Sci. [Paris] **164**: 607–609. 1917.—Abst. in Exp. Sta. Rec. **38**: 332. Mar., 1918.

1575. Van der Lek, H. A. A. **Biological or physiological races of plant parasites and their economic significance.** Tijdschr. Plantenziekten **23**: 85–98, 137–164. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. **39**: 148. Aug., 1918.

1576. Van Someren, V. G. L. **Melanism in Whydahs.** Avic. Mag. **10**: 40–41. Dec., 1918.

1577. VOGTHERR, KARL. **Über die theoretischen Grundlagen des Variabilitäts- und Desendenzproblems.** [On the theoretical foundations of the variability and descendance probems.] Zeitschr. indukt. Abstamm. Vererb. **19**: 39–72. Mar., 1918.

1578. WARREN, DON C. **Mutations in Drosophila Busckii COQ.** Amer. Nat. **51**: 699–703, 917.—Abst. in Jour. Roy. Microsc. Soc. **1918**: 192. June, 1918.

1579. WENTWORTH, E. N., AND J. B. SWEET. **Inheritance of fertility in Southdown sheep.** Amer. Nat. **51**: 662–682. 1917.—Abst. in Exp. Sta. Rec. **38**: 574–575. June 14, 1918.—Also in Jour. Roy. Microsc. Soc. **1918**: 179. June, 1918.

1580. WHITING, P. W. **Inheritance of coat-color in cats.** Jour. Exp. Zool. **25**: 539–569. April, 1918. Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. **1918**: 294–295. Sept., 1918.—[See Bot. Absts. 1, Entry 52.]

1581. WHITNEY, D. D. **The relative influence of food and oxygen in controlling sex in rotifers.** Jour. Exp. Zool. **24**: 101–138. *4 fig., 4 diagrams.* 1917.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. **1918**: 310. Sept., 1918.

1582. WILLIAMS, C. B. **Some problems of sex ratios and parthenogenesis.** Jour. Genetics **6**: 255–267. *5 fig.* 1917.—Abst. in Exp. Sta. Rec. **38**: 458–459. April, 1918.

1583. WOODS, FREDERICK ADAMS. **Will not morality necessarily improve?** Jour. Heredity **9**: 331–332. Nov., 1918.—See Bot. Absts. 2, Entry 270.

1584. ZIMMER, JOHN T. **Inherited feeding habit of herons.** Jour. Heredity **9**: 271. Oct., 1918.—Autbor observed that captive young herons were unable to pick up pieces of fish from the floor without several trials, but were unerring when the pieces were placed in a shallow basin of water. This was undoubtedly due to light refraction, since in nature they secure most of their food in shallow water. These herons were unable to profit by experience. Author believes this habit of facility in picking up food from shallow water rather than from the ground is inherited trait.—*R. K. Nabours.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

(Unsigned abstracts are by the editor.)

THALLOPHYTES

1585. SAUVAGEAU, C. **Sur les plantules d'une Laminaire a prothalle parasite (Phyllaria reniformis Rostaf.).** [Young plants of a parasitic Laminaria.] Compt. Rend. Paris **166**: 787–789. 1918.—Author gives a brief account of very young stages of *Phyllaria reniformis* found growing on a corraline alga (*Lithophyllum lichenoides*) at Banyuls-sur-Mer. He finds the plantlets springing from a vertical filament of several thin-walled cells wholly imbedded in the calcareous Lithophyllum, and, by similarity and analogy with what he has observed in actual cultures of other Laminariaceae, he interprets this imbedded and apparently parasitic filament as a sexual prothallus with an oogonium at its outer or free end, this oogonium persisting as the basal cell of the Phyllaria plantlet (sporophyte). Whether this unusual mode of existence in a calcareous alga has become a necessary adaptation for the prothallus of *Phyllaria reniformis*; whether it involves apogamy, and how the first penetration of its stone-like host is made, are questions yet to be answered.—*M. A. Howe.*

1586. WOLFE, J. J. **Alternation of generations in Padina.** Jour. Elisha Mitchell Soc. **34**: 78–109. 1918.—In *Padina variegata*, abundant at Beaufort, N. C., the sperms, eggs and

tetraspores are borne upon three separate plants. Tetraspores produce male and female plants in approximately equal numbers, and fertilized eggs produce tetrasporic plants, so that there is an antithetic alternation of generations. Eggs also germinate without fertilization, but the parthenogenetic plants die before reaching reproductive stage.—*Charles J. Chamberlain.*—[See Bot. Absts. 1, Entry 983.]

1587. MURPHY, P. A. **The morphology and cytology of the sexual organs of Phytophthora erythroseptica.** Ann. Bot. **32**: 115–153. *2 pl.* 1918.—Abst. in Exp. Sta. Rec. **39**: 431. 1918. [See Bot. Absts. 1, Entry 573.]

SPERMATOPHYTES

1588. BAILEY, L. W., AND W. P. THOMPSON. **Additional notes upon the angiosperms Tetracentron, Trochodendron and Drimys, in which vessels are absent from the wood.** Ann. Bot. **32**: 503–512. *1 pl., 9 fig.* 1918.—Authors discuss character of tracheidal tissue in secondary wood of these 3 genera, and in particular the status of certain scalariform vessel-like structures in wood of Drimys, described by Jeffrey and Cole in their criticism of authors' earlier paper on this subject. Term "vessel" is defined, and it is shown that structures in question cannot be regarded as true vessels. Evidence is brought forward that they are not segments of vestigial vessels but are typical tracheids having transitional types of pitting. Such cells occur not only as result of wounding, but normally in stem and root of all 3 genera studied. It is concluded that true vessels do not occur in these genera, and that there is no evidence to show that vessels once did occur in the group and have since been lost. Development of scalariform pitting and other features in structure of wood are discussed and attention is called to similarity of secondary wood of Tetracentron and Trochodendron to that of certain Pteridophyta and older gymnosperms. [See Bot. Absts. 1, Entry 1602.]

1589. DAVIE, R. C. **A comparative list of fern pinna-traces, with some notes on the leaf-trace in the ferns.** Ann. Bot. **32**: 233–245. 1918.—Earlier papers of author on anatomy of fern leaves are here supplemented by a list of 220 species, gathered from a wide range of genera. These species may be classified according to whether pinna supply is of "extra-marginal" or "marginal" type. These types are about evenly divided among the various genera. The grouping of genera so provided accords well with generic boundaries recognized by taxonomists. Conclusion is drawn that adaxial portion of pinna trace is portion dependent on heredity, while abaxial portion is variable in relation to features of individual leaf.—*M. A. Chrysler.*

1590. HOAR, CARL S. **The anatomy and phylogenetic position of the Betulaceae.** Amer. Jour. Bot. **3**: 415–435. *Pl. 16–19.* 1916.—Anatomical evidence, chiefly ray structures, leads author to conclude that Betulaceae belong near the base of the dicotyledons. Casuarina is closely related anatomically to Amentiferae and is also regarded as a primitive dicotyledon. [Through rev. by J. M. Coulter, in Bot. Gaz. **65**: 198–199. 1918.]

1591. HODGSON, R. W. **An account of the mode of foliar abscission in Citrus.** Univ. California Publ. Bot. **6**: 417–428. 1918.—Abst. by T. H. Goodspeed in Bot. Gaz. **66**: 75–76. 1918. [See Bot. Absts. 1, Entries 67, 191.]

1592. HOLMES, M. G. **A study in the anatomy of hazel-wood with reference to conductivity of water.** Ann. Bot. **32**: 553–567. *10 fig.* 1918.—Paper aims to find an anatomical basis for variation in conducting power of wood for water. A statistical method of investigating the constitution of wood from this standpoint is presented, the number, size and distribution of conducting elements of wood being portrayed in graphical form. Stool shoots of hazel were investigated and considerable variation noted in the constitution of wood of first year's growth. In passing from base to apex of shoot, a decrease in total amount of conducting tissue is recorded, and an increase in relative amount of conducting tissue per unit of area of wood.—[See Bot. Absts. 2, Entry 192.]

1593. Jensen, G. H. **Studies on the morphology of wheat.** Washington Agric. Exp. Sta. Bull. **150**: 3–31. *5 pl., 75 fig.* 1918.—Author has investigated morphology of reproductive structures in wheat, using 4 varieties,—Bluestem, Marquis, Hybrid and Little Club. No important morphological differences were observed between these, except that primordia of spike are produced near surface of ground in spring varieties and below it in winter varieties. Nothing out of the ordinary was observed in development of microspore and male gametophyte, megaspore and female gametophyte, fertilization and early development of embryo and endosperm Author describes and figures a thin-walled papilla in wall of young microspore, where spore touches tapetum, and suggests that this is the point through which absorption of food material by spore takes place. [Abst. by J. M. Coulter in Bot. Gaz. **66**: 288. 1918. Also in Exp. Sta. Rec. **39**: 341–342. 1918.]

1594. McClung, C. E. **Some considerations regarding microscopical technique.** Anat. Record **14**: 265–282. 1918—Micotechnique is a tool as yet imperfectly developed and merits all the attention we can give. Necessity for immediate fixation should be borne in mind. For this purpose it is better to fix in picro-formal at 38°C. in order to secure rapid penetration, and in Fleming's at 0°C. in order to keep tissue unchanged until fixed. Addition of urea, various sugars snd malic acids aids in fixation, especially nuclear sap. With Flemming's fixed material short washing gives good mitochondria and poor nuclei, long washing gives the reverse effect. Shrinkage occurs in dehydration, clearing, and infiltration. Therefore great care is essential.—*Farr.*

1595. Noyes, H. A., J. F. Trost, and L. Yoder. **Root variations induced by carbon dioxide gas additions to soil.** Bot. Gaz. **66**: 364–373. *9 fig.* 1918.—*Capsicum annuum abbreviatum, Lactuca sativa, Raphanus sativus* and *Phaseolus vulgaris* were studied. In all cases considerable alteration in shape of root system was induced by treatment of soil with carbon dioxide. Tops were affected much less than roots.—[See Bot. Absts. 1, Entry 1661.]

1596. Ruby, J. **Biological and morphological investigations on the olive and on its varieties cultivated in France.** Ann. Sci. Nat. Bot. **9**: 1–286. *86 fig.* 1917.—A "general botanical study" of the olive, including considerable morphological information. [Through abst. in Exp. Sta. Rec. **39**: 243. 1918.]

1597. Stanford, Ernest E., and Arno Viehover. **Chemistry and histology of the glands of the cotton plant, with notes on the occurrence of similar glands in related plants.** Jour. Agric. Res. **13**: 419–436. *Pl. 42–50.* 1918.—Authors describe occurrence of internal lysigenous glands in primary cortex, secondary cortex, foliage, flower and seed of *Gossypium hirsutum*. Glands in secondary cortex are simpler than the rest and often arise from a single cell. Glands are surrounded by envelope of flattened cells, the contents of which differ chemically according as the plant parts bearing them are normally exposed to light or not. Internal glands of this type are universally present in Gossypium and occur to some extent in the related genera Thespesia, Cienfugosia, Erioxylon and Ingenhouzia. Glands which function as nectaries are also described. These are morphologically distinct from the internal glands. A detailed study is made of chemistry of secretions of the internal glands.

1598. Chamberlain, Charles J. **Foreign pollen in Cycas.** Bot. Gaz. **66**: 392. 1918. [Rev. of: Le Goc., M. J. Effect of foreign pollination on *Cycas Rumphii*. Ann. Roy. Bot. Gard. Peradeniya **6**: 187–194. *Pl. 13.* 1917.]—In this species ovules reach full size after pollination by *Encephalartos* or *Macrozamia*, but no fertilization takes place and mature seeds show no embryo. Reviewer has previously noted a probably similar situation in *Strangeria*.

1599. Chamberlain, Charles J. **The embryo sac of Aster and Solidago.** Bot. Gaz. **65**: 571–572. 1918. [Review of: Palm, Bj. Zur embryologie der gattungen Aster und Solidago. Acta Horti Bergiani **5**: 1–18. *27 fig.* 1914.]—Author believes extensive development in anti-

podal region is due to growth of lower megaspores of tetrad, thus disagreeing with previous conclusions of reviewer and Miss Opperman. Reviewer holds author's evidence inconclusive and still maintains that cells in question are antipodals.

1600. Palm, Bj., and A. A. L. Rutgers. **The embryology of Aucuba japonica.** Recueil Trav. Bot. Néerland. 14: 119–126. *12 fig.* 1917.—*Authors show that apogamy almost certainly does not occur in this species.* [Through rev. by J. M. Coulter in Bot. Gaz. 66: 79. 1918.]

1601. Pfeiffer, Norma E. **The sporangia of Thismia americana.** Bot. Gaz. 66: 354–363. *Pl. 16.* 1918.—Further study of this north temperate zone representative of the Burmanniaceae demonstrates its similarity to most members of the family, in contrast to the apogamous *Burmannia coelistis.* *There is usual development of microsporangia, though with* marked abortion of sporogenous cells. Of the 4 megaspores produced, 2 outermost lie side by side and, with third, soon degenerate. Innermost megaspore produces a typical angiosperm embryo-sac, in which fertilization probably takes place and gives rise to a well developed embryo (for Burmanniaceae), imbedded in large-celled endosperm. A striking nucellar cap of tissue is a feature of seed.—*N. E. Pfeiffer.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

[Unsigned abstracts are by the editor.]

1602. Bailey, I. W., and W. P. Thompson. **Additional notes upon the angiosperms Tetracentron, Trochodendron and Drimys, in which vessels are absent in the wood.** Ann. Bot. 32: 503–512. *9 fig., pl. 16.* Oct. 1918.—In this continuation of previous studies the authors give evidence to prove that the scalariform tracheary elements, which have been described in traumatic root tissue, of *Drimys colorata,* are not vessel-like structures but are typical tracheides with transitional types of pitting such as occur in various Arthrophyta, Cycadophyta, Pteridospermophyta and Angiospermophyta. The interpretation that regards these elements in Drimys as traumatic recapitulation in a conservative organ is negatived by their occurrence in uninjured stems and roots of *Tetracentron, Trochodendron* and *Drimys.* The authors state that there is no structural evidence which might be considered to indicate that these vesselless angiosperms are a reduction series from ancestors with true vessels in their *secondary wood, and they conclude that these genera have retained this primitive type of* vesselless wood structure, in which respect they resemble some of the calamites, seed ferns and cycadeoids, namely the more primitive gymnospermous phylae, and contrasting in their anatomy with the Coniferophyta. [See Bot. Absts. 1, Entry 1588.]

1603. Chaney, Ralph W. **The ecological significance of the Eagle Creek flora of the Columbia River Gorge.** Jour. Geol. 26: 577–592. *4 fig.* 1918.—The Eagle Creek formation com*prises from 500 to 2700 feet of prevailingly pyroclastic rocks exposed in the gorge of the Co*lumbia River. Fossil plants have been collected from 18 localities representing about 80 species. The author discusses their ecologic significance and considers that he has representatives of both xerophytic and mesophytic types, which he interprets as upland oak forests and valley forests of maple, elm, sweet gum, etc. The former physiography is considered to have been of the bajada type and the climate to have been somewhat warmer and drier than prevails at the present time in the region. Because of its relations to the upper Clarno flora of Oregon the Eagle Creek formation is considered to be of upper Eocene age.

1604. Clements, F. E. **Scope and significance of paleo-ecology.** Bull. Geol. Soc. Amer. 29: 369–374. 1918.—A formulation of principles and a plea for the greater emphasis of the ecological aspects of paleontology as interpreted by the ecological results derived from studies of the existing biota.

1605. Kryshtofovich, A. **Occurrence of the palm, Sabal nipponica, n. sp., in the Tertiary rocks of Hokkaidô and Kyûshû.** Jour. Geol. Soc. Tokyo, 25: 59-66. Dec., 1918.—The presence of a large leafed fan palm in the early Tertiary of Japan in 43° N. Lat., about 8° north of the existing range of palms in that region adds to the problem of the botanist when he attempts an explanation of the almost worldwide distribution of such highly organized monocotyledons as the palms in the Upper Cretaceous and early Tertiary. The present new species, *Sabal nipponica*, is associated with species of *Lastraea*, *Acrostichum*, *Dicksonia*, *Taxodium*, *Populus*, *Zelkova*, *Carpinus*, *Nelumbium*, *Alnus*, *Platanus*, etc., indicating a probable contemporaneity with the Kenai coal-bearing series of Alaska, and adds another to the long list of facts which indicate the great poleward extension of mild climatic conditions in the early Tertiary.

PATHOLOGY

Donald Reddick, *Editor*

[Unsigned abstracts are by the editor.]

1606. Arthur, J. C. **An outline of the history of Phytopathology.** Science 48: 651-652. 1918.—[Review of Whetzel, Herbert Hice. An outline of the history of Phytopathology.]—"This orderly presentation of the evolution of a science destined to play an increasingly wider and more important part in the affairs of human well-being and achievement is particularly timely. Professor Whetzel has compressed into the hundred and thirty pages of his book a well balanced and helpful outline of the historical aspects of the science. It is a valuable addition to botanical literature."—[See Bot. Abst. 1, Entry 377.]

1607. Brierley, William B. **The microconidia of Botrytis cinerea.** Bull. Misc. Inf. Kew 1918: 129-146. *1 pl.* 1918.—Morphology and physiology.

1608. Butler, E. J. **Immunity and disease in plants.** Agric. Jour. India (Special Indian Science Congress Number). *P. 10-82.* 1918.—General discussion of susceptibility and resistance based on Indian and other literature.—*L. R. Hesler.*

1609. Campredon d'Albaretto, E. **[Simple solutions of copper sulfate against vine mildew.]** Ann. R. Acad. Agric. Torino 40: 13-19. 1918.—2.5 per cent solution of copper sulfate in 5 per cent dextrin is an effective therapeutic. It is to be used in preference to bordeaux only in emergencies. [Through abst in Internat. Rev. Sci. Pract. Agric. 9: 898-899. 1918.]

1610. Castella, F. de, and C. C. Brittlebank. **[Notes on downy mildew of the vine in Australia.]** Jour. Dept. Agric. Victoria 15: 685-700. *Fig. 1-2.* 1917.—Record of an epiphytotic in 1917. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 396. 1918. Abst. in Exp. Sta. Rec. 39: 357. 1918.]

1611. Cayley, Dorothy M. **Pseudomonas seminum n. sp., a bacterium injurious to peas in England.** Jour. Agric. Sci. 8: 461-479. *Pl. 4-7.* 1917.—[Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 633-634. 1918.]

1612. Cotton, A. D. **Diseases of parsnips.** Bull. Misc. Inf. Kew 1918: 8-21. *2 pl., 2 fig.* 1918.—"Canker"—A more or less open wound, at first reddish brown in color, which occurs on shoulder or upper part of root, frequently ending in destruction of entire root. Lesions originate in horizontal growth cracks and are augmented by soil fungi, bacteria and animals. Suberization of exposed tissue occurs but no wound-cork develops as in carrots, etc. Cultural practices are thought to account largely for cracking, but use of lime or of salt seems to have reduced it.—Descriptions and synonomy of the following organisms with very brief notes on their destructiveness: *Erysiphe polygoni*, *Phyllachora pastinacae* (with a revised and corrected description), *Ramularia pastinacae*, *Cercosporella pastinacea*, *Plasmopara nivea*. [Abst. in Internat. Rev. Sci. Pract. Agric. 9: 899-900. 1918.]

1613. C[OTTON], A. D. **[Activities of the] Pathological laboratory.** Bull. Misc. Inf. Kew **1918**: 39–42. 1918.—Brief report of diseases prevalent in England in 1917 with special mention of black-currant rust (*Cronaratium ribicola*) and of onion diseases caused by *Botrytis*, *Peronospora* and *Sclerotinia*.—Notes on research in connection with *Sphaerotheca mors-uvae*, *Podosphaera ceucotricha* and *Botrytis cinerea*.—Work on wart diseases [of potato] was mostly without result but "the absolute immunity of certain varieties is a piece of sheer good fortune which has saved the country from a very grave situation."

1614. EDSON, H. A. **The importance of disease control to the grower of certified potato seed.** Bull. Wisconsin Potato Growers' Assoc. **3**: 21–22. 1918.

1615. FINLOW, R. S. **Rhizoctonia in jute: the inhibiting effect of potash manuring.** Agric. Jour. India (Special Indian Science Number). P. 65–72. 1918.—Jute (*Corchorus* sp.) is attacked by *Rhizoctonia solani* particularly when grown on laterite red soils. Analyses show such soils to be very deficient in calcium and phosphorus but total per cent of potash is .3. Use of lime on such soil increases yields enormously but does not affect presence of Rhizoctonia. Use of potash (hyacinth ash) gave increased yields (100 per cent better than checks or plots treated with carbonate of soda). Rhizoctonia was rampant throughout the non-potash plots which always contained about ten times as many diseased plants as the potash plots.

1616. GILLESPIE, L. J. **The growth of the potato-scab microörganism at various hydrogen-ion concentrations as related to the occurrence of potato scab.** [Abstract.] Abstr. Bact. **2**: 1. 1918. [See Bot. Absts. 1, Entry 309.]

1617. GILLESPIE, LOUIS J., AND LEWIS A. HURST. **Hydrogen-ion concentration—Soil type—Common potato scab.** Soil Science **6**: 219–236. 1918.—Authors' summary contains the following: "Examination of a large number of soils from northern Maine showed an excellent correlation between hydrogen-ion concentration and occurrence of common potato scab. Soils having a hydrogen-ion exponent as low as 5.2 rarely produced scabby potatoes, soils having exponents much higher generally did produce scabby potatoes. Similar results were found for a few soils of different origin and type. The limiting zone of hydrogen-ion exponent for the potato scab organism appears to be about the same for the soil as had previously been found for culture media.—The characteristic difference of hydrogen-ion exponent between the Caribou and the Washburn loams has been confirmed. The typical Caribou loam has a hydrogen-ion exponent of about 4.8 and is free from scab, whereas the Washburn loam is gen-hydrogen-ion exponent of about 4.8 and is free from scab, whereas the Washburn loam isgenerally less intensely acid (shows larger exponents) and potatoes grown on it are usually scabby.—A considerable number of soils having the exponent 5 are successfully cultivated in potatoes and truck crops without liming, showing that the exponent 7 (which indicates physico-chemical neutrality) can hardly be taken in general as "the rational" end-point in lime requirement tests. No such standard end-point is suggested, this being left for future determination with specific crops." [See Bot. Absts. 1, Entry 309; 2, Entry 849.]

1618. GRAVES, ARTHUR HARMOUNT. **Resistance in the American chestnut to the bark disease.** Science **48**: 652–653. 1918.—In vicinity of New York City no trees of *Castanea dentata* were found immune to attack of *Endothia parasitica* but a considerable number of resistant trees were found. Evidence of resistance is based on slow increase of lesion upon inoculation; occurrence of trees in a region long since devastated by the disease; the long period the disease had been present in the trees themselves; extensive development of callus tissue, etc.; grouping of the trees in well defined areas, pointing to a genetic variation; manifestation of resistance by all parts—coppice, twigs, branches, etc.—indicating an inherent conditions.

1619. HEMMI, T. [Japanese.] **[On the gloeosporiose of Caladium.]** Sapporo Nat. Hist. Soc. **7**: 41–70. 1918.—Pathological, morphological and cultural studies on *Gloeosporium*

aracearum found on the living leaves of *Caladium* in hot house of Sapporo Agricultural College. Growth on synthetic media compared with that of allied fungi and their strains isolated from many different plants. It grows well on comparatively strong acid media and liquifies gelatin; maximum temperature 37-38°C, optimum 27-28°C. and minimum 6-7°C. —*S. Hori.*

1620. HILLIARD, C. M., AND MILDRED A. DAVIS. **The germicidal action of freezing temperatures upon bacteria.** Jour. Bact. 3: 423-431. 1918.—*B. coli* used but conclusions of interest in connection with over-wintering.—"Intermittent freezing exerts a more effective germicidal action than continuous freezing.—The degree of cold below freezing is not very important in the destruction of bacteria. There is no critical temperature below freezing where germicidal effect is greatly accelerated.—Death-rate is much higher in media frozen solid than in same media not solid and at a slightly lower temperature.".—Crystallization, probably resulting in mechanical crushing is an important germicidal factor at freezing point.

1621. HORI, S. [Japanese.] [**Third report on banana disease in Bonin islands.**] Engei no Tomo [The Horticulturist's Friend] 14: Nos. 9-11. 1918.—Since 1899, by the increased facilities of communication, banana culture in Bonin islands has offered the most profitable industry to the islanders; in 1912, it had attained the magnitude of about 350 acres and was increasing. At the end of 1912, however, banana plants in some parts of the islands suddenly showed an abnormal growth, were dwarfed (2-3 ft.), with small yellowish green leaves. The disease spread with rapidity, all the banana plants of the islands were destroyed during 1913-1915 and sugar cane culture took the place. The author has made voyages several times since 1915 to investigate the cause of the disease and to perform field experiments. It became clear that the disease is not caused by the attack of nematodes, fungi or bacteria, but it is of a purely non-parasitic nature, caused by the deficiency of potash in the soil and the manure of common usage. In the field manure experiment, the plants on those plots where no potash or excessive nitrogen was applied, dwarfed 67-100 per cent, while on the plot manured with an ample quantity of potash by potassium sulphate or wood ashes only 12 per cent. Above all, on the plot to whichwas applied stable manure with potash the plants attained the best growth with no sign of the disease. In the therapeutic experiment, both diseased plants on the spot and diseases shoots transplanted, mostly recovered by the application of the manure above mentioned.—*S. Hori.*

1622. HOWITT, J. E., AND D. H. JONES. **The more important fungus and bacterial diseases of vegetables in Ontario.** Ontario Agric. Col. Bull. 258: 1-48. *illustr.* 1918.—[Abst. in Internat. Rev. Sci. Pract. Agric. 9: 771. 1918.]

1623. HUTSON, J. C. **Notes on certain plant bugs connected with cotton in St. Vincent.** West Indian Bull. 17: 27-39. 1918.—Biological studies and methods of control of insects instrumental in transmitting the fungi of internal boll disease.

1624. JOHNSON, A. G., AND R. E. VAUGHAN. **Ergot in rye and how to remove it.** Wisconsin Agric. Exp. Sta. Ext. Circ. 94: 1-4. 1918.—A salt brine is prepared of sufficient concentration to float the ergot sclerotia and shriveled kernels which may then be skimmed off. It is necessary to wash the grain after treating to prevent seed injury.—*James G. Dickson.*

1625. JONES, L. R., A. G. JOHNSON, AND C. S. REDDY. **Bacterial blight of barley.** Jour. Agric. Res. 11: 625-643. *Pl. 4, fig. 2.* 1917.—*Bacterium translucens* n. sp. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 631-632. 1918.]

1626. KELLER, G. N. [**Tobacco growing in Ireland** (The experiments in 1916).] Jour. Dept. Agric. Tech. Instr. Ireland 17: 461-466. 1917.—Varieties "Broad leaf burley" and "Irish gold" very susceptible to root rot (Thielavia basicola). [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 64. 1918.]

1627. LIND, J. **Kunstgödning som Middel mod Plantesygdomme. [Artifical fertilization as a means of controlling plant diseases.]** 36 *p.* Kopenhagen, 1917.—A discussion of the possibilities of altering the susceptibility of plants to diseases by the use of artificial fertilizers. [Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. **28**: 35–37. 1918.]—*W. H. Rankin.*

1628. LÜSTNER, G. **Feinde und Krankheiten der Gemüsepflanzen. Ein Wegweiser fur ihre Erkennung und Berkämpfung. [Insect enemies and diseases of vegetables. A guide for their determination and control.]** Bearbeitet im Auftrage des Herrn Ministers für Landwirtschaft, Domänen *n.* Forsten. *72 p. 43 fig.* Stuttgart, 1917. [Abst. by O. von Kirchner in Zeitschr. Pflanzenkr. **28**: 37. 1918.]

1629. MOLZ, E. **[The selection of plants resistant to diseases, animal pests and adverse meterological conditions.** Zeitschr. Pflanzenz. **5**: 121–244. 1917.—Compilation. [Through abst. in Internat. Rev. Sci. Pract. Agric. **9**: 554–558. 1918.]

1630. NISHIKADO, Y. **Studies on the rice blast fungus. I.** Ber. Ohara Inst. landwirtschaft. Forsch. **1**: 171–218. *Pl. 3–4.* 1918.—Report of work on the strains of *Piricularia* isolated from rice, crab-grass, Italian millet, green foxtail, *Zingiber mioga*, and *Z. officinale* of Japan. By infection and cultural experiments and morphological comparisons, it is proved that: *P. oryzae* causes the blast of rice plant; *P. grisea* is parasitic on crab-grass; *P. setariae* sp. nov. occurs on *Zingiber mioga* and *Z. officinale.* These species of *Piricularia* cannot infect healthy plants other than their respective hosts. *P. oryzae* does not grow in carbon dioxid. In dry conditions, the spores maintain their vitality from the autumn to the next summer, hence spores may be a source of early infection.—*S. Hori.*

1631. NISHIKADO, Y., AND C. MIYAKE. [Japanese.] **[Disinfection of rice grain for the control of the brown spot disease.]** Byo-chu-gai Zasshi [Jour. Plant Protec.] **5**[9]: 1–20. 1918. —Investigation of hot water treatment of rice seed to prevent brown spot disease caused by *Helminthosporium oryzae.* Since the disease may appear even from seed sown on thoroughly disinfected sand, spore- or mycelium-bearing seed must account for at least 50 per cent of origin of the disease. Spores are killed in 10 minutes in hot water, 51°C., while air dry seed is not injured by treatment 10–15 minutes in 54–55°C. Practically, to prevent the disease, rice seed should be treated at seeding time for 10 minutes at 52°C. or 5 minutes at 54°C. after soaking 24 hours in water of room temperature.—*S. Hori.*

1632. NOWELL, WM. **Internal disease of cotton bolls in the West Indies. II.** West Indian Bull. **17**: 1–26. 1918.—Green bug (*Nezara viridula*), leaf-footed bug (*Leptoglossus batteatus*), and cotton stainers (*Dysdercus* spp.), puncture cotton bolls injuring the young seeds; this in turn stops the development of lint and causes the shedding or drying up of bolls. Pea chink (*Edessa meditabunda*) causes little direct injury and does not transmit the internal boll disease.—The 4 fungi of internal boll disease were found in the seeds of 20 species of plants in 7 orders and 15 genera.—Injury to cotton bolls is caused principally by one fungus in one locality and by another in a different locality.—Punctures of the green bug bring about infection with the fungi of internal boll disease only when the bugs are transferred from diseased plants.

1633. NOWELL, WM. **Diseases of economic plants. [Part II of Report on the prevalence of some pests and diseases in the West Indies during 1917.]** West Indian Bull. **17**: 96–102. 1918.—Brief notes on occurrence, distribution and prevalence of various diseases of sugar-cane, cotton, cacao, lime and other citrus trees, bananas and plantains, maize, coco-nut, onions, pigeon peas, nutmegs, and insects.—Notes on phanerogamic parasites.

1634. PEGLION, V. **[Monilia sp., the cause of a specific gummosis of the apricot tree, in Italy.]** Rend. R. Accad. Lincei, Cl. Sci. fis. mat. e nat. **V, 26**: 637–641. 1917.—*Sclerotinia cinerea* or *S. laxa.* "The most significant character is the absolute restriction of parasitism to the apricot tree." [Through abst. in Internat. Rev. Sci. Pract. Agric. **9**: 635–636. 1918.]

1635. Petch, T. **Black rot disease of tea.** Ceylon Dept. Agric. L'f't. 2. *3 p. fig. 2.* 1917. —Chief characteristics of disease are persistence of hanging dead leaves and occurrence of dead leaves united in clusters. The fungus- *Hypochnus* sp., occurs also on *Calophyllum burmanni* and *Hemidesmus indicus*. Infection experiments failed but fungus is thought to be truly parasitic. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 119–120. 1918.]

1636. Petri, L. **[Blepharospora cambivora n. gen. and n. sp., a cause of ink disease in chestnut trees.]** Rend. R. Accad. Lincei, (Cl. Sci. fis. mat. e nat.) V, 26: 297–299. 1917.—Fungus is near the Pythiaceae.—Record of successful inoculations. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 397. 1918.]

1637. Salmon, E. S. **On forms of the hop (Humulus lupulus L.) resistant to mildew (Sphaerotheca humuli (D. C.) Burr.)** Jour. Agric. Sci. 8: 455–460. 1917.—Ten seedlings mostly of Italian origin have been found practically immune to the "biologic form" occurring on hops. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 251–252. 1918.]

1638. Savastano, L. **[Treatment of Fusicladium pirinum var. Eriobotryae, injurious to the Japanese medlar tree.]** R. Staz. Sper. Agrum. e Frut. Acireale Bull. 29: 1–6. *2 fig.* 1917. —Secured control by dormant (?) treatment with strong lime-sulfur solution. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 636–637. 1918.]

1639. Savastano, L. **[The control of a disease of the Japanese medlar caused by Fusicladium pirinum var. Eriobotryae.]** R. Staz. Agrum. e Frut. Acireale, Bull. 33: 1–2. 1918.—When the disease is present on branches spray in August with lime-sulfur solution 10–12 per cent, normal density 1.25. The same solution should be used about January 1, *i.e.*, when the disease begins to appear, and February 1. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 901. 1918.]

1640. Schenk, P. J. **Tegen een drietal rozenvijanden.[Against a triad of rose enemies.]** Rosarium 25: 49–52. 1915.—A method of control for mildew which also controls two insects of the rose.—Spray with 2.5 per cent "California mixture," 1 per cent salycilic acid in 1 per cent alcohol with addition of 2 per cent green soap. [Through abst. by O. Von Kirchner in Zeitschr. Pflanzenkr. 28: 41–42. 1918.]—*W. H. Rankin.*

1641. Schribaux. **Resistance du manitoba aux maladies cryptogamiques.** Compt. Rend. Acad. Agric. France 4: 530–532. 1918.—Wheat variety, Manitoba, especially resistant to smut (bunt) and perhaps to rust.

1642. Shear, C. L. **Endrot of cranberries.** Jour. Agric. Res. 11: 35–42. 1917.—A soft rot of berries of *Oxycoccus macrocarpus* caused by *Fusicoccum putrefaciens.* [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 254. 1918.]

1643. Stevens, F. L. **Mycology and plant pathology.** Plant World 21: 53–54. 1918. [Rev. of: Harshberger, John W. A text-book of mycology and plant pathology.]

1644. Torrend, C. **[Insect and vegetable parasites of the cacao tree in the State of Bahia, Brazil.]** Broteria, Ser. Bot., 15: 106–127. *4 pl. 1 fig.* 1917. Also *ibid.*, Ser. vulgar zação Sci. 15: 263–279. *4 fig.* 1917.—*Phytophthora faberi* causes fruit rot and *Corticium lilacinofuscum* is epiphytic on green branches. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 523–524. 1918.]

1645. Turner, W. F. **Nezara viridula and kernel spot of pecan.** Science 47: 490–491. 1918. [See Bot. Absts. 1, Entry 374.]—Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 1000–1001. 918.

1646. Vaughan, R. E. **Progress in control of plant diseases.** Ann. Rept. Wisconsin State Hort. Soc. 48: 179–186. 1918.

1647. Vaughan, R. E., and A. G. Johnson. **Fight grain smuts and blights.** Wisconsin Agr. Exp. Sta. Ext. Circ. 57: 1-4. 1916. Revised, Mar., 1918.—Barley should be soaked two hours in a solution of one pint formaldehyde (40 per cent) in 30 gallons water. Oats, wheat and rye should be soaked five minutes in 1 pint in 30 gallons water, drained and covered for two hours. The grain should be spread out to dry after treatment. Treatment with the smut machine is satisfactory for oats, wheat, and rye.—*James G. Dickson.*

1648. Weir, James R. **Experimental investigations on the genus Razoumofskya.** Bot. Gaz. 66: 1-31. *Fig. 1-19.* 1918—Cross inoculations and cultural studies were made to determine the range of hosts of this group of mistletoes. *Razoumofskya campylopoda* and *R. cryptopoda*, both occurring on yellow pines, are found to be distinct species. The former was found by inoculation to infect *Pinus resinosa*, *P. sylvestris* and *P. montana*. *Razoumofskya laricis* Piper infects not only the American species of *Larix* but also *L. europea* and *L. leptolepis*. *Abies grandis*, *Pinus ponderosa*, and *P. contorta* were infected with difficulty, indicating that this species is primarily a larch parasite. *R. Douglasii abientina*, common on *Abies*, proved to be identical with *R. Douglasii*, common on *Pseudotsuga taxifolia*. Cross inoculations and field observations indicate that this species is of importance only on *Pseudotsuga taxifolia*. The lodgepole pine mistletoe, *R. americana* has as its true host *Pinus americana*, but will attack several other species of hard pines. The hosts of the hemlock mistletoe (*R. tsugensis*) are shown to be *Tsuga heterophylla*, *T. canadensis* and *Abies lasicarpa*. The negative cultural tests of the different species are also given. The fact that several of these mistletoes readily infect exotic hosts indicates the importance of preventing the accidental importation of mistletoe seeds to the native homes of the hosts. [See Bot. Absts. 1, Entry 1377.]—*H. W. Anderson.*

PHYSIOLOGY

B. M. Duggar, *Editor*

[Unsigned abstracts are by the editor.]

PERMEABILITY AND DIFFUSION

1649. Collins, E. J. **The structure of the integumentary system of the barley grain in relation to localized water absorption and semi-permeability.** Ann. Bot. 32: 381-414. *9 fig.* 1918.—The author gives the results of experiments to show that most of the water absorbed by the barley grain is taken up through the micropylar region rather than through the cuticularized cell-walls. In the micropylar region are special areas that permit the entry of water and here must be sought the apparatus for the remarkable selective permeability which prohibits the entry of mineral acids and most salts but passes water with comparative freedom. Solutes such as iodine and acetic acid barely pass at all through the general surface of the grain but, like water, enter by the restricted region at the micropylar end. Nitric acid, which also penetrates the micropylar end of the grain by selective action, neither destroys the enveloping membrane nor impairs the efficiency of the selective apparatus.

The barley grain does not possess perfect impermeability to any solute tested. After many days sulphuric acid gradually enters if the grains are kept in the solution. It was observed in this connection that the initial concentrating effect of barley upon dilute sulphuric acid is gradually reversed, the solution finally exhibiting a concentration lower than the initial.—Penetration of silver nitrate and of sodium chloride is checked by the outer cuticularized walls. This layer of cutin is permeable to water and solutes only to the extent usually associated with cuticle. If the grain covering is used as a membrane in an osmotic cell slow passage of water will take place for months toward a salt solution, but no salt passes in the reverse direction for a considerable time. The initial absorption of water supplies the need of the embryo; the inner layers in the seed coat form a well constructed system for conveying this water to that part of the grain where it can be accessible to the embryo. The subsequent distribution of liquid in the endosperm follows the paths of enzyme disintegration during germination. It is suggested that the water absorbed and distributed during germination takes up and carries with it the enzymes which digest the reserves.—*S. M. Zeller.*

1650. CROZIER, W. J. **Cell penetration by acids. IV. Note on the penetration of phosphoric acid.** Jour. Biol. Chem. 33: 463–470. 1918.—Following a line of work already considerably developed by Harvey, Crozier, and Haas, the author finds that the speed with which H_3PO_4 penetrates the tissues of *Chromodoris* is affected by density of the cells and by quantities of buffer materials present in the cells. A mathematical expression is developed for the curves obtained.

1651. THODAY, D. **Some observations on the behavior of turgescent tissue in solutions of cane sugar and of certain toxic substances.** New Phytol. 17: 57–68. *8 fig.* 1918.—Imbibition by potato tissue in several solutions was determined by the change in weight. The results obtained with cane sugar are essentially the same as those obtained by Stiles and Jörgensen (Ann. Bot. 31: 425). Toxic substances, such as mercuric chloride, mercuric cyanide, osmic acid, chloroform, picric acid and phenol were observed. In M/100 mercuric chloride the initial swelling was greater than in distilled water and the same result obtained with osmic acid (M/100) may be compared with similar results obtained by Stiles and Jörgensen with sulphuric acid.—*S. M. Zeller.*

METABOLISM, ENZYMES, FERMENTATION

1652. BURNETT, T. C. **Does the liver secrete a catalase accelerator?** Proc. Soc. Exp. Biol. and Med. 15: 80. 1918.—Indications are furnished that variations in catalase activity in different organs may be due to the presence or absence of accelerators rather than to differences in the catalase content.

1653. EDSON, N. A. **The effect of frost and decay upon the starch in potatoes.** Jour. Indust. Chem. Engin. 10: 725–726. 1918.

1654. WATANABE, C. K., AND V. C. MYERS. **A delicate method of determining invert activity.** Proc. Soc. Exp. Biol. and Med. 15: 142–143. 1918.

DEVELOPMENT

1655. BIOLETTI, FREDERIC T., AND F. C. H. FLOSSFEDER. **Topping and pinching vines.** California Agric. Exp. Sta. Bull. 296: 371–384. 1918.—Experiments made with the Carignane and Tokay grape showed that topping or pinching the vines during the growing season is harmful. Some varieties growing on very rich soil and others whose fruit buds are mostly produced on the laterals might be benefited by moderate summer pruning. [See Bot. Absts. 1, Entry 734.]—*F. F. Halma.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1656. PARR, ROSALIE. **The response of Pilobolus to light.** Ann. Bot. 32: 177–205. 1918. —The writer presents a review of the literature on theories of response which are referred to as invoking (1) intensity difference, (2) ray direction, (3) wave-length, (4) energy. The response of *Pilobolus* to carefully calibrated light of different wave-lengths and intensities was studied. *Pilobolus* responds to light of all regions of the visible spectrum. The presentation time gradually decreases from red to violet. There are no intermediate maxima and minima. The presentation time does not vary in direct ratio with the measured energy value, but in inverse ratio to the square root of the wave frequency. The product of the square root of the frequency and the presentation time diminishes with the decrease in the energy value of the spectral regions, and is an approximate constant for a given light source. The spectral energy in its relation to presentation time may be expressed approximately in the Weber-Fechner formula, if the wave frequencies be made a function of the constant. The relation of the spectral energy to the presentation time may also be approximately expressed by the Tröndle formula, the wave frequencies being made a function of the constant.—*S. M. Zeller.*

TEMPERATURE RELATIONS

1657. Free, Montague. **Effect of low temperatures on greenhouse plants.** Brooklyn Bot. Gard. Record 8: 14–17. 1919.—General indications as to the conditions of the plants when, due to coal shortage, the temperature in the houses fell as low as 28–30°F.

1658. Kiesselbach, T. A., and J. A. Ratcliff. **Freezing injury of seed corn.** Nebraska Agric. Exp. Sta. Bull. 163: 1–16. 1918.—The causes of freezing injury of seed corn are late maturity of the corn and abnormally early freezing weather. By selecting early *maturing ears or planting seed of some earlier type the damage caused by late maturity can* be overcome.—*F. F. Halma.*

TOXIC AGENTS

1659. Brenchley, Winifred E. **Organic plant poisons. II. Phenols.** Ann. Bot. 32: 259–278. *18 fig.* 1918.—The phenols suggest possibilities for the partial sterilization of soils. In experiments upon barley and pea plants grown in water cultures, M/100 concentrations of phenols were fatal. In weaker concentrations the toxic action varies considerably for different phenols. Concentrations below a certain limit do not retard plant growth. No signs of stimulation were observed.—*S. M. Zeller.*

1660. Hall, Ivan C., and Lillian J. Ellefson. **The elimination of spurious presumptive tests for B. coli in water by the use of gentian violet.** Jour. Bact. 3: 329–354. 1918.—Gentian violet, 1 part in 20,000, and often even 1 part in 100,000, is found to be efficacious in eliminating from the lactose broth cultures many species of bacteria interfering with the usual "presumptive test" for the coli group. The selective inhibiting action was tested on a variety of Gram-positive anaerobes, a group most frequently interfering with the presumptive test, and in these cases it was highly satisfactory. The dye incidentally inhibits also the less important (because less frequently gas-forming) aerobes. Finally, it retards the growth of certain strongly proteolytic forms which, while not fermenting glucose, may nevertheless interfere with the test by producing sufficient alkali to preclude the development of the characteristic red colonies of *B. coli* when the individuals are relatively few.

1661. Noyes, H. A., J. F. Trost, and L. Yoder. **Root variations induced by carbon dioide gas additions to soil.** Bot. Gaz. 66: 364–373. *Fig. 1–9.* 1918.—These experiments were planned primarily to determine the value of soil aeration, or rather the injurious action of carbon dioxide accumulation in the soil. The plants were grown in soil in Wagner pots and CO_2 was introduced subterraneously. The plants employed were *Capsicum annuum abbreviatum, Lactuca sativa, Raphanus sativus,* and *Phaseolus vulgaris.* All were found to be affected more or less by the addition of carbon dioxide, this action being marked upon the roots. Where 650 cc. of CO_2 was introduced per pot per hour, normal root development ceased. [See Bot. Absts. 1, Entry 1595.]

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. Schramm, *Editor*

[Unsigned abstracts are by the editor.]

ALGAE

1662. Nieuwland, J. A. **Critical notes on new and old genera of plants.—X.** Amer. Midland Nat. 5: 50–52. 1917.—See Bot. Absts. 1, Entry 1421.

FUNGI

1663. Arthur, J. C. **Uredinales of Guatemala based on collections by E. W. D. Holway, IV. Puccinia on Carduaceae, Form-Genera and Index.** Amer. Jour. Bot. 5: 522–555. 1918.

-This is the fourth and concluding number of a series of articles with the above general title y the same author. The preceding parts were published in the same journal (Amer. Jour. Bot. 5: 325-336, 420-446, 462-489. 1918). In this series of papers 232 species of rusts distributed on 32 genera are recorded from Guatemala. In the present paper detailed citations of ollections and critical notes are given with reference to 41 species of *Puccinia* on Carduaceae, in the form-genus *Uredo*, one in *Peridermium*, and 5 in *Aecidium*. New species are decribed as follows: *Puccinia Hodgsoniana* on *Eupatorium* by F. D. Kern; *P. solidipes* and *P. asiporula* on *Eupatorium*, *P. ordinata* on *Calea*, *P. semota* on *Gymnolomia*, *P. cornuta* on *Notoptera*, *P. Schistocarphae* on *Schistocarpha*, *P. inaudita* on *Zexmenia*, *P. Coreopsidis* on *Coreopsis* by Jackson and Holway; *Uredo Triniochloae* and *U. Zeugitis* on Poaceae, *U. Fuchsiae* on Onagraceae, *U. Rondeletiae* on Rubiaceae, by Arthur and Holway. The author also escribes *Aecidium seriatum* on Euphorbiaceae and transfers *Uredo Trixidis* Kern & Kellerm. o *Puccinia* and *Endophyllum singulare* Diet. & Holw. to *Aecidium*. An index to species nd to host plants for the entire series is appended. [See Bot. Absts. 1, Entries 384, 385, 386.] -*H. S. Jackson.*

1664. Cotton, A. D. **Diseases of parsnips.** Bull. Misc. Inf. Kew. **1918**: 8-21. *2 pl. fig.* 1918.—See Bot. Absts. 1, Entry 1612.

1665. Fairman, Charles Edward. **New or noteworthy Ascomycetes and lower fungi rom New Mexico.** Mycologia 10: 239-264. 1918.—The paper is based on collections made y Paul C. Standley (see Mycologia 10: 34). New species are described of the following enera: *Diatrype*, *Didymella* (2), *Apiosporella*, *Rhabdospora* (2), *Leptosphaeria* (2), *Gibberidia*, *Pyrenophora*, *Hendersonia* (5), *Microdiplodia* (3), *Phyllachora*, *Hysterium*, *Patellea*, *Phoma* 2), *Dothiorella*, *Placosphaeria*, *Coniothyrium*, *Ascochyta*, *Ascochytula*, *Stagonospora*, *Crypotostictis*, *Camarosporium* (2), and *Arthrobotryum*. New varieties are described in the ollowing genera: *Eutypella*, *Leptosphaeria*, and *Coniothyrium* (2). *Teichospora cercocarpi* Earle) appears as a new combination.—*H. M. Fitzpatrick.*

1666. Gardner, M. W. **Anthracnose of Cucurbita.** U. S. Dept. Agric. Bull. 727. *p. 168.* 918.—This paper contains a historical presentation of the synonomy of *Colletotrichum agenarium* (Pass.) Ell. and Halst. [See Bot. Absts. 2, Entry 1037.]—*H. M. Fitzpatrick.*

1667. Neger, F. W. **Experimentelle Untersuchungen uber Rusztaupilze.** Flora 10: 7-139. *Fig. 1-31.* 1917.—The author describes as new *Gyroceras fumagineum* and *Triposporium pinophilum*. *Coniothecium crustaceum* (*Sarcinomyces crustaceus* Lindner) appears as new combination, the genus *Sarcinomyces* Lindner being reduced to synonomy under *Coniothecium*. What have been considered as conidia in the latter genus the author states is the egetative body, no mycelium being present, the mycelium formerly attributed to species of he genus being that of other intermingled fungi. The author, furthermore, describes for the pecies true conidia, which he regards as previously unrecorded. "Dematium II" and "Hormiscium II" are provisionally listed as new. Extensive notes, especially on characteristics n pure culture, are given for all the above forms as well as for *Dematium pullulans*, *Cladosporium herbarum*, *Atichia glomerulosa* Stein, *Fumago vagans* Pers., *F. foothii* Berk. & Dem., nd one unidentified species each of *Torula*, *Helminthosporium*, and *Botryotrichum*.

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

[Unsigned abstracts are by the editor.]

1668. Davidson, Anstruther. **Lupinus mollisifolius spec. nov.** Bull. Southern California Acad. Sci. 17: 57. 1918.—A new species of lupine is described from southern California.

1669. Davidson, Anstruther. **Lupinus Paynei spec. nov.** Bull. Southern California Acad. Sci. 17: 58-59. 1918.—The author describes a second shrubby species of lupine from outhern California as new to science.

1670. Davidson, Anstruther. **Additions to the local flora.** Bull. Southern California Acad. Sci. **17**: 60–61. 1918.—Several additions to the local flora of southern California are placed on record.

1671. Hayata, Bunzo. **Icones Plantarum Formosanarum nec non et Contributiones ad Floram Formosanum.** *Roy 8 vo. Vol. vii, p. 107, pl. I–IV, fig. 69.* Taihoku, Mar. 25, 1918.—Approximately two hundred and seventy-five species and varieties, mostly flowering plants belonging to eighteen families, are treated in the present volume. The following species and varieties are described as new: *Stellaria reticulivena, Thea hozanensis, T. Nakaii, Rubus suishaensis, R. arisanensis* var. *horishaensis, R. Somai, R. linearifoliolus, Photinia daphniphylloides, Abelia ionandra, Galium Morii, G. tarokoense, Diospyros Sasakii, Euphorbia tarokoensis Ficus kakauensis, F. ochobiensis, F. tannoensis, Quercus spinosa* David var. *Miyabei, Q. tarokoensis, Juniperus formosana* Hay. var. *concolor, Podocarpus nankoensis, Liparis keitaoensis Trillium Morii, Allium morrisonense, Paspalum akoensis, P. distichum* L. var. *anpinense Isachne heterantha, I. arisanensis, Panicum pseudodistachyum, P. barbipedum, P. suishaense, Spodiopogon tohoensis, S. hogoensis, S. Takeoi, Pollinia geniculata, P. Fauriei, P. arisanensis, P. formosana, Pollinopsis Somai, Andropogon kwashotensis, Agrostis suizanensis, A. transmorrisonensis, A. sozanensis, A. morrisonensis, Muehlenbergia arisanensis, Calamagrostis formosana, C. morrisonensis, Brachypodium formosanum, Polystichum Morii, Selaginella kelungensis, S. subcaulescens, S. pseudo-involvens,* and *S. Somai.* One new genus is also proposed namely, **Polliniopsis** of the Gramineae. The total number of species of the Formosan flora, so far as known, is 3359, which is indicative of the relatively rich and varied flora of that country.

1672. Hitchcock, A. S., **Generic types with special reference to the grasses of the United States.** Amer. Jour. Bot. **5**: 248–253. 1918.—The author discusses the subject of generic types, presents certain definitions and principals relative to the selection of type species, and illustrates by examples drawn from the grasses.

1673. Leechman, Alleyne. **The genus Rhizophora in British Guiana.** Bull. Misc. Inf. Kew. **1918**: 1–8. 1918.—The author recognizes three species of *Rhizophora* growing along the coast in the neighborhood of Georgetown, British Guiana. One of these, *R. Harrisonii,* is described as new to science.

1674. Maxon, William R. **A new Anemia from Mexico.** Jour. Washington Acad. Sci. **8**: 199–200. 1918.—*Anemia Makrinii* Maxon is described as a species new to science from the state of Oaxaca.

1675. Maxon, William R. **A new Selaginella from Oklahoma and Texas.** Proc. Biol. Soc. Wash. **31**: 171–172. Dec. 30, 1918.—*Selaginella Sheldoni* is described as a new species of the *S. rupestris* group.

1676. Pegler, A. **On the flora of Kentani.** Ann. Bolus Herb. **2**: 163–184. 1918.—In the present article the author continues the enumeration of the plants of Kentani, listing nearly 600 species and varieties of flowering plants, ferns, and lycopods.

1677. Ricker, P. L. **A synopsis of the Chinese and Formosan species of Albizzia.** Jour. Washington Acad. Sci. **8**: 242–246. 1918.—The author records twelve species of *Albizzia* from China and Formosa. The following are either described as new or given new specific names: *Albizzia Meyeri, A. Henryi,* and *A. corniculata.*

1678. Ricker, P. L. **A sketch of botanical activity in the District of Columbia and vicinity.** Jour. Washington Acad. Sci. **8**: 487–498. 516–521. 1918.—The author presents a historical account of floristic botany of the District of Columbia and vicinity and a compiled bibliography of the taxonomic literature dealing mainly with the flowering plants and ferns of the same region.

1679. Sargent, C. S. **Notes on North American trees. III. Tilia. II.** Bot. Gaz. **66**: 494–511. 1918.—In continuation of his treatment of the North American lindens the author recognizes and describes eight additional species and seven varieties, including the following which are characterized as new to science: *Tilia caroliniana* Miller var. *rhoophila, T. texana, T. texana* var. *grosseserrata, T. phanera, T. phanera* var. *scabrida, T. lasioclada. T. heterophylla* Ventenat var. *Michauxii, T. heterophylla* Ventenat var. *nivea, T. heterophylla* Ventenat var. *amphiloba, T. monticola, T. georgiana*, and *T. georgiana* var. *crinita*.

1680. Standley, Paul Carpenter, **Rubiales. Rubiaceae (pars).** North Amer. Flora 32^{1}: 1–86. Dec. 28, 1918.—Three tribes of the Rubiaceae are elaborated in the present part namely, *Condamineeae* with eight genera and twenty-eight species, *Oldenlandieae* with six genera and fifty-three species, and *Rondeletieae* with six genera and one hundred and nineteen species. The following new combinations with the name-bearing synonym in parenthesis, and new species are included: *Chimarrhis ferruginea* (*Rustia ferruginea* Standley), *Portlandia Shaferi, P. albiflora* Britt. & Harris, *Isidorea cubensis, Clavenna tetrandra* (*Peplis tetrandra* L.), *Houstonia floridana, H. procumbens* (*Anonymos procumbens* Walt.), *Neomazaea Shaferi, Acrosynanthus parvifolius* Britton, *A. latifolius, A. lucidus* Britton, *A. trachyphyllus, Rondeletia Ehrenbergii* K. Schumann, *R. Langlassei, R. darienensis, R. aspera, R. Bourgaei, R. pansamalana, R. Galeottii, R. Deamii* (*Bouvardia Deamii* Donn. Smith), and *R. costaricensis*.

1681. Suksdorf, Wilhelm, **Cardamine oligosperma and its near allies.** Rhodora **20**: 197–199. 1918.—This article includes two new combinations namely, *Cardamine lucens* (*C. oligosperma* var. *lucens* G. S. Torrey) and *C. bracteata* (*C. hirsuta* subsp. *oligosperma* var. *bracteata. O. E. Schulz*).

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